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SHIPS AND MINES.

THE NATIONAL STEEL CO., ONE OF THE STRONGEST OF THE INDUSTRIAL ORGANIZATIONS, ACQUIRES COMPLETE CONTROL OF THE CHAPIN AND WINTHROP MINES, CAPABLE OF PRODUCING 1,250,000 GROSS TONS OF ORE ANNUALLY, AND OF NINE STEEL STEAMERS OF A MILLION TONS SEASON CAPACITY.

Mr. L. C. Hanna of the firm of M. A. Hanna & Co., Cleveland, and President W. E. Reis of the National Steel Co., Chicago, have just executed in Cleveland contracts that involve the transfer to the National Steel Co. of all the property of the Chapin Mining Co., Winthrop Iron Co., Mutual Transportation Co. and Menominee Transit Co. This means mines capable of producing, when worked to the maximum in their present condition, 1,250,000 gross tons of iron ore, and ships that will move in the trade in which they will be engaged—Escanaba to Ohio ports—a full million tons of ore in a season. It is understood that Mr. L. C. Hanna managed to effect this great transfer of property—not as a mere control, but practically the entire stock of the four corporations—without the necessity of calling a single meeting of directors, and on the other hand it is announced also that the steel company will take over these large interests without a new issue of stock and in fact without new securities of any kind. Relations between sellers and purchasers were of such a nature that there was no examination whatever of the properties. The management of the different interests transferred remains in the office of M. A. Hanna & Co., and there will, of course, be no disturbance in the details of operation as regards either mines or ships.

All information regarding prices involved in the transaction is withheld, but it is certain, of course, that the figures are in the millions, in view of the great capacity of the Chapin mine, and in view also of the fact that both mines and ships—the latter not to be had new at any price—have almost doubled in value within the past six or eight months. It is quite probable that the ships were sold at figures equal to their original cost on leaving the ship yards several years ago. But in purchasing this property at the high prices that were undoubtedly demanded for it, the National Steel Co., strong, prosperous and possessed of surplus funds, is fortifying itself in a position that has been forced by the other big steel industrials, that of owning the mines and providing for the transportation of the ore.

The steel steamers involved in this transaction are the Coralia, Corsica, Corona and Cambria of the Mutual company's fleet, and the Grecian, Roman, German, Saxon and Briton of the Menominee fleet. They are not of the modern 6,000 or 7,000 ton type but they are all good vessels, practically new, built for the ore trade and as noted above capable of moving from Escanaba, which is the port of shipment for both the Chapin and Winthrop mines, full 1,000,000 gross tons of ore in a season. The transfer also gives to the steel company an interest in one of the ore docks at Ashtabula that was partly owned by the Mutual Transportation Co. Both of the transportation companies are Ohio corporations. The Menominee fleet of five steamers is now under charter to the Canada-Atlantic Transportation Co., operating between Chicago and Parry Sound, Ont., but the charter expires with the close of the present season of navigation, after which the vessels will, of course, be turned to the Escanaba ore trade. The Canada-Atlantic company had about concluded negotiations a short time ago for the purchase of these five vessels, but the deal fell through on account of a misunderstanding regarding insurance. The Canada company will now be required to look elsewhere for steamers for its service.

Both of the mining companies involved in the sale are Michigan corporations. The Chapin mine of Iron Mountain, Mich., (Menominee range) is so well known as one of the largest producers of the Lake Superior region that extended reference to it is probably unnecessary. Its output up to the close of 1898 aggregated 7,499,450 gross tons. At the beginning of the present year the Chapin had in sight between 4,000,000 and 5,000,000 tons of ore with enormous reserves. Though not strictly a Bessemer ore the Chapin is a component of Bessemer mixtures. This mine is not owned in fee, but the lease is a long one, twenty years, just beginning, and the royalty, something like 10 to 30 cents a ton according to prices of ore, is very low in view of the change that has taken place of late in ore values. The fee of the Chapin is owned by the Chapin estate, or rather C. A. Chapin, who is the only heir. The Chapin Mining Co. also owns the Hamilton and Ludington mines adjoining the Chapin property. The Winthrop Iron Co. of Ishpeming, Marquette county, Michigan, the other corporation passing to the control of the National company, owns in fee 160 acres of mineral land and in addition 80 acres of surface. The Winthrop began shipping in 1890 and its total output to the close of last year was 1,236,814 gross tons.

The National Steel Co., although not so large as some of the other steel and iron combinations, has been looked upon since its organization as a very strong concern. It has not owned outright any mines or vessels up to this time, but has a one-sixth ore interest in the Oliver Iron Mining Co., which is controlled by the Carnegie company, and also has a number of long-time ore contracts at what are now looked upon as very low figures. Mr. W. E. Reis, the president, who has conducted all the negotiations with Mr. L. C. Hanna for this purchase, was president of the Shenango Valley Steel Co. of New Castle, before that company became a part of the National Steel Co., with the Bellaire Steel Co. of Bellaire, O., the Aetna-Standard Co. of Mingo Junction, O., the Sharon Iron Co. of Sharon, Pa., the Ohio Steel Co. of Youngstown, O., and King, Gilbert & Warner of Columbus. Since the consolidation of the aforenamed companies in the National Steel, the Thomas Furnace Co. of Niles, O., and the Ohio Iron Co. of Zanesville, have been acquired by purchase. The National Steel is now said to have about 80 per cent of its ore requirements in its own hands. Its requirements are about 3,000,000 tons annually.

THE DEMAND FOR SHIP BUILDING MATERIAL.

A cry has gone up all over the country on account of the famine of material for ship construction. As in nearly all other branches of the steel and iron industry, it is not a matter of price but a question in nearly every case of getting the material at any cost. Prices spoken of in some cases range from $50 to $60 a ton for ship plate at the mill, as against little more than $10 a ton before the "boom" came on. There are not, of course, any big orders being placed at these figures, and in fact there are really no transactions of any account at any price. The manufacturer who has small lots of material to offer for early delivery can get almost any figure he may ask for it. Orders placed in advance of these extreme conditions have of late been delayed more than ever. In a number of cases keels have not been laid simply because material to proceed has been lacking and there can be no doubt that work on new merchant ships everywhere throughout the country, as well as naval contracts of all kinds, will be seriously delayed by existing conditions. Looking to the future, there seems to be no more hope for the ship builder than there was two or three months ago, when $40 was looked upon as a price that would certainly bring relief in the form of increased productive capacity. Increased capacity is expected shortly in a few mills, notably at the Homestead plant of the Carnegie company, but all of this seems to have been anticipated in orders booked some time ago. Probably when the change comes it will be found that the trouble has been due more to a general demand for material than to the ship building industry having radically outgrown the productive capacity of mills that engage in this line, but it must be admitted that the ship builders, for the time being, at least, are absolutely prevented from planning on future business. They are left to the struggle of trying to get material ordered long ago for work which they have in hand. An amusing feature of the situation is noted occasionally. Some time ago one of the largest steel concerns of the country ordered several cranes from a well known manufacturer of special machinery of this kind. The order for material for the cranes was given, of course, to the steel company that was to use them. The steel company is now almost daily urging the delivery of the cranes, although they are not themselves able to furnish the material that is to go into them.

The builder of wooden vessels appears to be little better off at the present time, as regards supplies of material, than his brethren whose energies are devoted to steel construction. Reports from the yards in Maine and along the Pacific coast indicate very high prices in several lines, with the usual difficulty in securing delivery. Manila rope, yellow pine and iron for strapping and other purposes have all made great advances during the past six months. In some cases the increase amounts to 100 per cent and on an average it probably approximates about a quarter that. It is sufficient anyhow to contribute to the uneasiness of the builders of wooden vessels, as well as those engaged in steel lines.

DAHLGREN SHOWS NEARLY 30 KNOTS.

The United States torpedo boat Dahlgren, built by the Bath Iron Works of Bath, Me., made 29.76 knots over a measured course in the Kennebec river off Georgetown last Saturday morning, July 22. This speed was made with 300 revolutions in shallow fresh water. As the water in some parts of the course was only 18 feet deep, the builders of the Dahlgren are confident that the little vessel will easily make her required speed the first time they take her to the Southport deep salt water course. The Dahlgren's trials up to date have been machinery tests of value similar to the usual dock trials, and no attempt has been made to get high speed. On her first trial the little vessel steamed at 13 knots. This was increased to 17 knots on the second trip. Then a cruise at 21 knots was successfully performed, and this was followed by speeds of 24 and 26 knots. The boilers were then covered and the fire room made air tight. On the next run, with an air pressure of about 1½ inches, a speed of 27½ knots was attained and last Saturday, with about 3 inches air pressure the speed was raised to the before-mentioned high rate of 29.76 knots. This is the highest speed ever attained by any vessel on the Atlantic coast, and it is the highest speed ever attained by any torpedo boat of her size, with the exception of the French torpedo boats Forben and Cyclone, and the Bath builders are confident that the Dahlgren will beat the Forben record of 31 knots on her official speed test.

HIGH GRAIN FREIGHTS.

Next to the announcement of the sale to the National Steel Co. of ships and mines controlled in the office of M. A. Hanna & Co., Cleveland, the most important item of news in shipping circles on the great lakes this week is the payment of 3½ cents freight to vessels that are to take wheat from Duluth to Buffalo during the latter half of September. This rate, which is equal to $1.30 a ton on iron ore, indicates what is expected in the grain trade during the closing months of the season. Quite a large amount of tonnage—mostly big steel steamers—has been placed with Duluth shippers at the rate noted. Freights in all other lines continue strong, just as they have been every day since the opening of navigation. More cargoes than ships is still the rule everywhere. Coal shippers do not seem to be making much of a gain in the movement of their product, especially as regards the coal to go to Lake Michigan ports. They are hoping, however, that the heavy ore movement will be reduced shortly and thus permit of more coal being carried, but another element in this calculation comes up now in the restlessness among dock laborers which is causing general anxiety.

The new Spreckles tug Fearless, recently completed by the Union Iron Works, San Francisco, has been chartered by the government for service as a tender and dispatch boat in San Francisco bay.

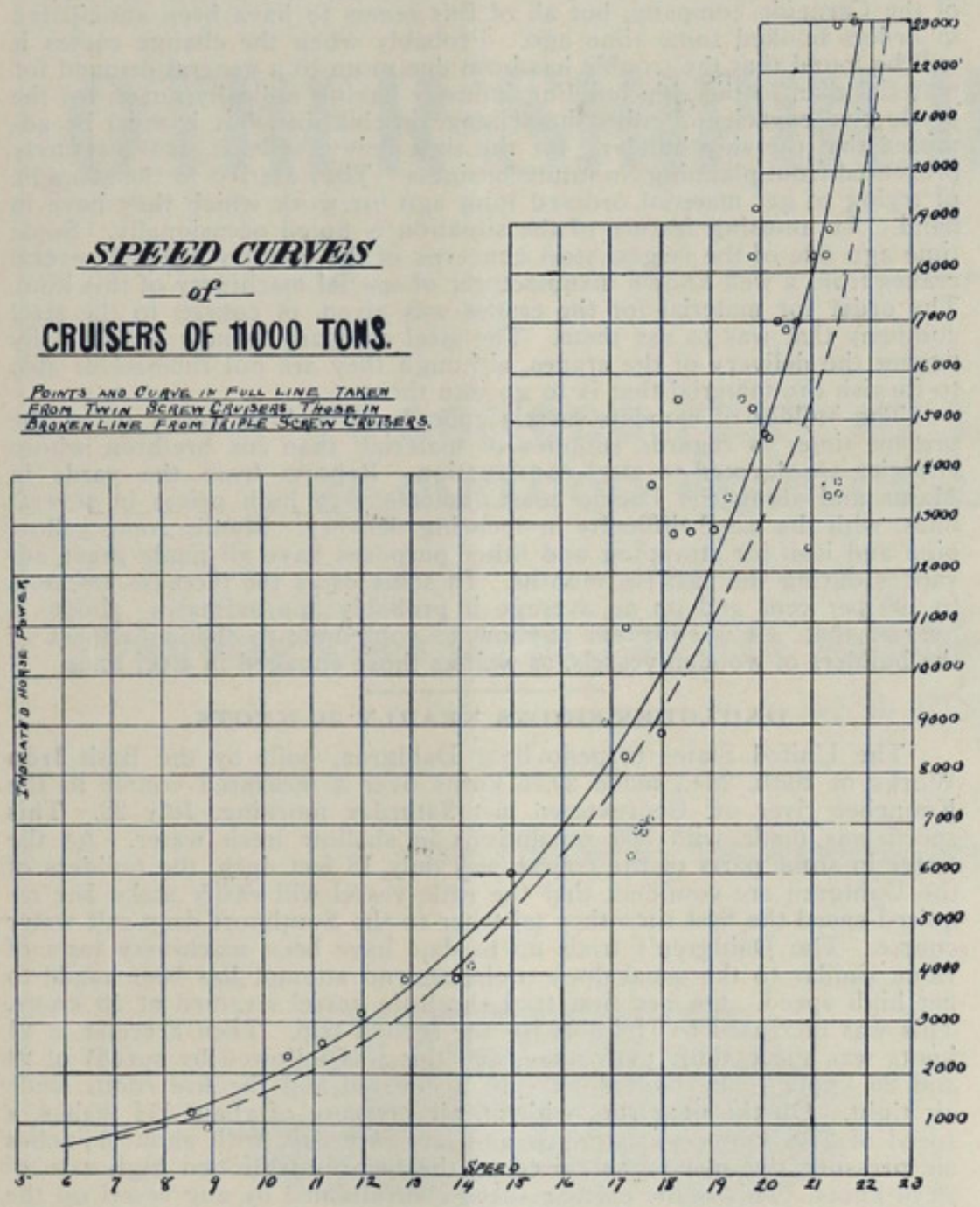
ADMIRAL MELVILLE'S REPLY.*

THE ENGINEER-IN-CHIEF OF THE UNITED STATES NAVY MAKES ANSWER TO CRITICISM FROM ENGLISH ENGINEERS REGARDING HIS ADVOCACY OF THE USE OF TRIPLE SCREWS IN VESSELS OF WAR.

BY REAR ADMIRAL GEORGE W. MELVILLE

I note that the principal desire expressed by the member of the Institution in regard to this paper is for more data. I fully appreciate the position of Sir William White regarding data which he is unable to publish. In fact, much of the information used by me in the preparation of this article is such as I feel unwilling to make public. I am, however, at liberty to give the results obtained from a consideration of the data, and I have done so. I realize that a considerable amount of detailed information which was omitted might have been included in the article. This omission was caused largely by my desire that the paper should not be too long for ready presentation before the Institution of Naval Architects. It was caused also by the fact that the number of trials from which the conclusions were drawn, something over 200, was considered too small upon which to base any absolutely accurate figures, although establishing fully the general law. On that account such figures as have been included in my paper have been specifically stated to be tentative. They are subject to alteration as a result of future experiment. I have attempted so carefully to avoid any exaggeration of the advantages of triple screws that I think the figures enumerating the economic gains due to their use, both for high and low powers, will be found greater rather than less than those given in my paper.

In deference, however, to the expressed desire of the institution, I submit such data regarding the performance of triple screw ships as may

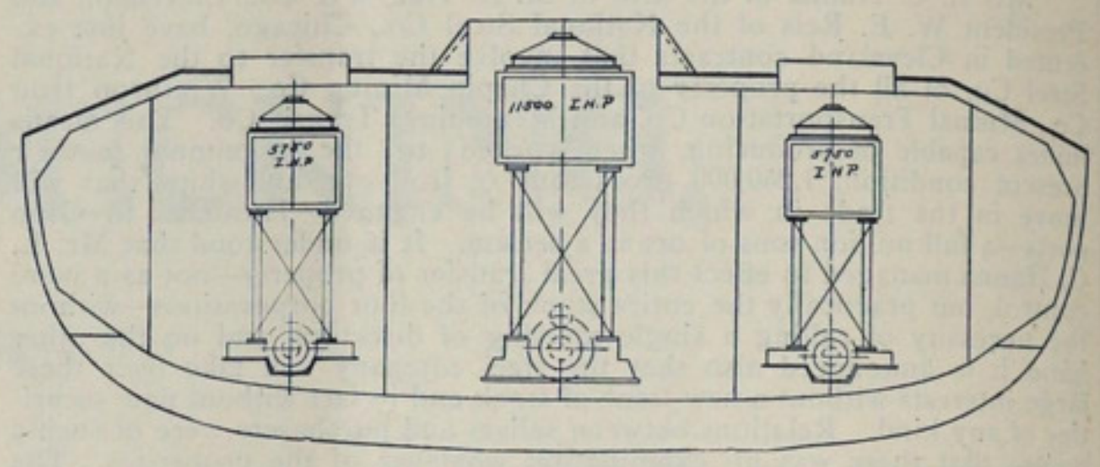


be communicated without breach of a public trust. In this connection let me remark that I regret very much that Sir William White finds himself unable to give us the benefits of such model experiments as he may have made with triple screws. While I believe that no tests of propellers are so valuable as those obtained from the propellers themselves in position on ships where the theoretical conditions are thus minimized and where we have to deal only with full loads and with service conditions, I am sure that it would be very interesting to compare these results with those obtained from tank experiments. It appears to me that such comparison would be a good test of the accuracy of model trials.

I append a speed and power curve of certain battleships reduced to 12,500 tons displacement by Froude's well known laws of comparison, giving a separate curve to those ships fitted with triple screws. All trials from which these curves were constructed are of ships of approximately the same size, none of them being of less than 10,000 tons displacement; all belong to the same navy; they have the same character of hull and the same general under-water body. They are, in fact, almost identical in all respects, with the exception of the propelling machinery and of the slight modifications in the under-water body necessary from the introduction of a central screw in the ships so fitted. Consideration of these curves will show at once that the power required is, in all cases, high in proportion to the speed. This is due to the peculiar character of the hulls in all of the ships considered. It is to be noted, however, that these characteristics obtain in the cases of the triple-screw battleships as well as in those fitted with a twin-screw system. The points marked by small circles are obtained from actual trials and include the power of the auxiliary machinery.

I append also a speed and power curve of cruisers, reduced to 11,000 tons displacement by the same laws of comparison. While these vessels are not so homogeneous in type as the battleships cited, it will be noted that there is with them about the same gain for the triple-screw system in the power required to attain a given speed. This difference is somewhat greater than that which I have given in my paper as the probable advantage to be derived from the use of triple screws. Each point is from the actual trial of some cruiser, although they are not all from the same navy. Only a part of these trials includes the power of the auxiliary machinery.

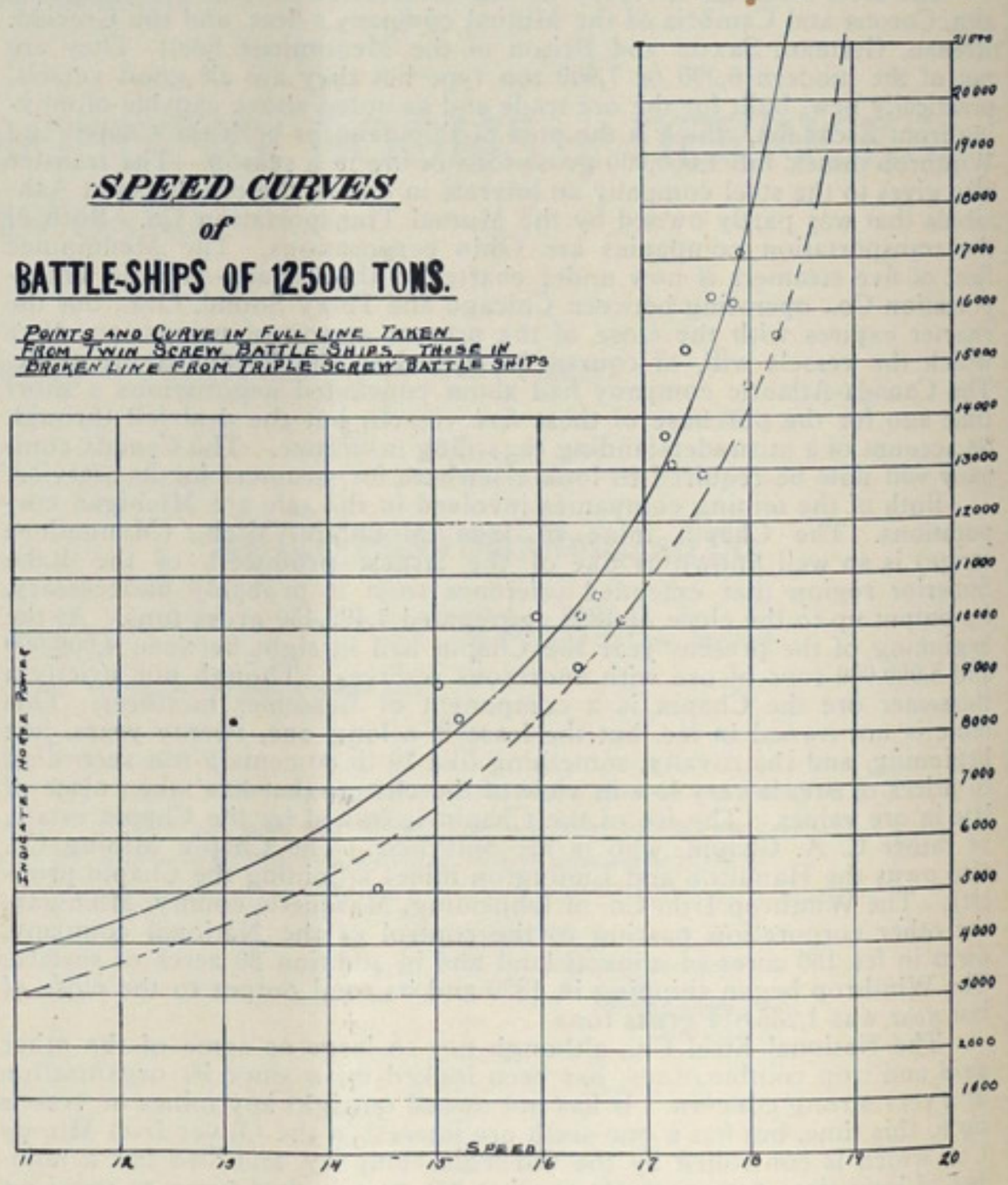
It appears to me that these curves, drawn as they are to give the fullest advantage to the system of twin-screw propulsion, develop fully



ARRANGEMENT OF ENGINES IN CRUISER.

the superior efficiency of the triple-screw system for full power trials; or, indeed, wherever all engines are in use. However, as Sir William White says, the matter of the propulsive efficiency of the propellers is but one of the desiderata to be sought in the design of a naval vessel. I submit however, that the superior propulsive efficiency of triple screws is an element of considerable advantage in their favor, although it must by no means be considered the deciding one. The deciding point in this matter seems to me to be the fact that naval vessels do at least 90 per cent of their cruising at speeds below 16 knots. In vessels of the fast type now so universally prevalent, the condensation in the low pressure cylinders is enormous when the ships are making these low speeds.

Mr. Barnaby has pointed out that the greater efficiency of propulsion incident to the use of three screws and consequent upon the utiliza-



tion of the following wake would apparently imply that a single propeller is more efficient than are twin screws. I have stated that up to a certain speed I consider that a single screw is most economical. Beyond that speed it is necessary to increase the size of this screw so greatly that the efficiency of the propeller is considerably reduced, on account of the increased friction and also on account of the increased difficulty of securing a free run of water to the blades. I am not sure when the critical point is passed. In the light of experience, however, it would seem that for ships having a maximum speed of as much as 15 knots the advantages due to the division of the propelling instrument into two screws are more than equivalent to the loss due to working these screws in the less advantageous position under the quarters of the ship. This may explain why

*Referring to a paper from Engineer-in-Chief Melville ("The Logical Arrangement of the Motive Power of War Ships"—Marine Review of April 20, 1899.) read at the last meeting of the Institution of Naval Architects in London, and in which extended argument was presented in support of the use of triple screws in vessels of war.

twin screws are in many cases more efficient than single screws. The use of triple screws, however, includes not only the advantages due to the use of smaller screws, but also the advantage due to the following wake. Triple screws must, therefore, always be more efficient than twin screws.

Data concerning the cruising efficiency of ships fitted with triple screws have been obtained from various sources. Tests of the steam consumption of the main and auxiliary engines of the triple-screw cruiser Minneapolis have been made. Trials have been made of this and other ships working with one, two and three screws at (A) constant speed; (B) constant power; (C) with a fixed coal consumption. Trials have been made of the Kaiserin Augusta (the details of which have been published) with and without a dragging screw. We have made trials of the Minneapolis at a constant speed and have measured the speed of rotation of the central screw (A) when revolving freely and (B) when connected with the central engine. Several twin screw ships have been tried with one engine with a resultant gain in coal consumption at the lower speeds when not only was there a heavy drag from the idle screw but also there was a considerable rudder resistance. Trials have been made of the Kaiserin Augusta working with one engine (A) with the center engine and (B) with one of the wing engines, in either case the other screws being left to revolve freely. The difference in power required to attain a fixed speed in the last trials measured the resistance of the rudder.

The trials of the Kaiserin Augusta, which were conducted with great thoroughness, measured accurately the drag of the screw and also the resistance of the rudder, the latter being, at a speed of 14.1 knots, considerably more than twice as great as the drag of two idle screws when one of the wing engines was used alone. These trials developed fully the further fact that there is not sufficient propeller area in the central screw (the three screws being equal) to drive the ship economically at a speed greater than 9 knots. Trials of the Minneapolis were made with a constant coal consumption and working with both one and two engines and with absolutely the same auxiliaries in use in both cases. It had been found that the condensation in an engine was approximately constant irrespective of the power developed, this condensation increasing slightly for the lowest powers. On these trials with a fixed coal consumption, with two engines in use, 938 horse power were developed, giving the ship a speed of 9.53 knots. With one engine only in use there was sufficient steam to give 1,236 horse power, though the speed of the ship did not exceed 9.36 knots. Knowing from previous experiments exactly the steam consumption per horse power of these engines, it was possible to ascertain accurately the condensation, which was found to be, as has been stated in my paper, about one pound of water per horse power of the maximum power of the engine.

The resistance of a dragging screw was measured in the experiments of the Kaiserin Augusta. It, as well as the engine friction, was also obtained on the Minneapolis in the following manner: The number of revolutions of the central engine when coupled with and turned by its dragging screw was observed accurately for a fixed speed of the ship and also the number of revolutions of this screw for the same speed of the ship and when uncoupled from the central engine. The power developed by the propelling engines (the two wing engines) was observed for the two conditions and the difference between these powers measured the unloaded engine friction of the center engine. Further, on the assumption that the resistance of the dragging screw varied as the square of the difference between the number of revolutions made by it and the number of revolutions which would give it a zero slip, there was obtained the ratio between the resistance of the screw and the resistance of the engine and screw co bined. The resistance of the dragging screw ascertained in this manner agreed very closely with that obtained from the results of experiments on the Kaiserin Augusta.

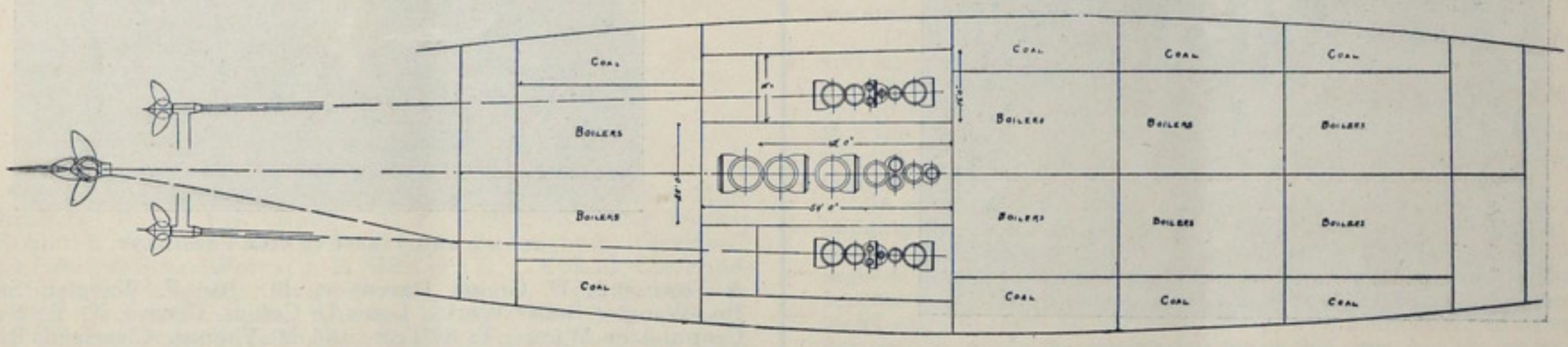
It is of importance to note that the unloaded engine friction of the central engine was, at a speed of ten knots, considerably greater than the drag of the central screw when the latter was left to revolve freely. If it be granted that the engine friction varies as the power of the engine (this is only an approximation of the correct rule) it is evident from the above that the horse power required to attain a speed of 10 knots is greater with two engines than it would be with one, if the latter has sufficient propeller area to avoid excessive slip. This is quite apart from the saving due to the decreased condensation of the engines. In fact, the Minneapolis ran at the rate of 9.73 knots with 1872.6 horse power and with one engine, while with two engines to make a speed of 9.71 knots she required 1940.94 horse power. On the other hand, however, the speed of the Kaiserin Augusta was 9 knots with two engines developing 932 horse power, while for a speed of 9.07 knots with one engine, 1050 horse power were required. As I have said, in order that one engine alone may work properly, it is necessary that the propeller should be of sufficient disc area, which is not the case when the propeller is designed to transmit but one-third of the full power, and it is to this cause that I attribute the above comparatively unfavorable results. Experience with twin-screw ships has shown that propellers having a disc area of one-half that which is necessary to drive a vessel at a full speed of as much as 20 knots are efficient at ordinary cruising speeds. It appears to me that these results form a very strong argument against the use of a small central engine for cruising purposes.

The figures set forth in my paper as to the power absorbed in the drag of the screw are the maximum; those given as to the gains due to the use of triple screws under cruising conditions are minimized. Instead of stretching the case in favor of three screws, I believe that I have done rather the reverse. I have been careful to give the established twin-screw practice the benefit of every doubt, which I think is quit proper. There are, however, a great many points in favor of the triple-screw system which are touched upon in my article and which have not been controverted in the least. I cannot say that I recommend the installation of triple screws in all naval vessels, but wherever as much as one-half the total power is sufficient to obtain a speed of, say, 16 knots, that system appears to me to be the only logical one to install.

The weight and cost of the machinery in a triple-screw ship is certainly no greater than for large twin-screw machinery of the same power. It is possible, as was shown off Santiago in the case of the Minneapolis, to couple up, without damage, the central screw of a triple-screw ship while the vessel has a speed of 18 knots. This was actually done and is an instance of the great tactical advantage possessed by triple screws over the method of arranging two engines on the same shaft, a system which our recent war experience will probably prevent us from installing in any future naval vessels. In the discussion of my paper attention has been called to the engines not ordinarily in use under cruising conditions with triple-screw practice. I desire to call attention again to the fact that there is quite as much power not in use in twin-screw practice for the same ship and speed. Further, the idle power in triple-screw practice is maintained in much more efficient condition while cruising and this with considerable more ease than obtains if all the machinery is in motion.

The matter of the short lengths of shafting outside the ship with triple screws is one to which I think not sufficient attention has been paid. It would avoid the necessity for the 70-inch propeller shafts which, I believe, are now being used.

As to the space gained by the arrangement of triple-screw machinery proposed by me in this paper, I may say, that, in a design now being prepared, it is found that the use of a large central engine and two small engines saves enough space below the protective deck from that required for twin screw machinery to install the evaporating plant of this ship and to provide for a pump room. I append a short sketch of this design. It will be noticed that the central engine is a five-cylinder engine. This is intended to be used only in connection with the wing engines and when the maximum power is to be developed. The wing engines, it will be noticed, are four-cylinder engines and it is expected that these will be used during ordinary cruising. The number of cylinders ordinarily in use will, therefore, be but eight. No difficulty has been experienced in securing sufficient ammunition rooms, etc. The most serious problem has probably been the installation of the steering gear.



SUGGESTION FOR PROPELLING MACHINERY OF 23,000 INDICATED HORSE POWER IN A 12,000-TON CRUISER.

The United States navy had a twin-screw ship in 1862, the Forbes, and for river service in the civil war had a great many multiple-screw ships called at the time "tin-clads." There was also the Agamenticus class of twin-screw monitors, constructed in 1863 for our navy. These were four ships of something over 3,000 tons, and one of them visited the Thames something over thirty years ago. This was some time before Sir William White first advocated the use of twin screws in the British navy. .....

The scheme proposed by Mr. Barnaby for working the central shaft by means of a circulating pump engine would probably lead to a slight economical gain, on the principle that the engine efficiency will probably be greater than the efficiency of the dragging screw. I think, however, that the introduction of this feature will not lead to any very great saving and it might interfere with quickly connecting up the central engine at the commencement of a chase, for instance. This is a detail, however, which further experience may very possibly show to be worthy of installation and of use, at least during ordinary cruising.

I am pleased to note that Sir William White says that a continuation of progress in design along present lines may lead to triple or other multiple screws being introduced into the British navy. I believe that we have already arrived at the point where triple screws are considered necessary. .....

In conclusion, I desire to thank the institution for the discussion of this paper. I regard intelligent criticism, whether favorable or the reverse, as of much value in bringing out the points of any matter at issue.

The expenditure for repairs on dry dock No. 2 at the Brooklyn navy yard, which was recently severely damaged, will be considerably heavier than was originally anticipated. When Rear Admiral Endicott, chief of the bureau of yards and docks of the navy department made an examination last week, he estimated that all of the $300,000 available would be necessary to repair the damage. Now Civil Engineer Asserson, after a careful examination, finds that the outlay will be very much in excess of the figure given. Mr. Asserson found that the abutments at the entrance had been displaced and were moving and that cavities had appeared under the altar sides of the structure. Sand and mud were also leaking into the dock, and it was found that the cavities have weakened the stability of the sides of the structure, in consequence of which the work of repair will be exceedingly difficult, as the sides must rest on a solid backing of earth.

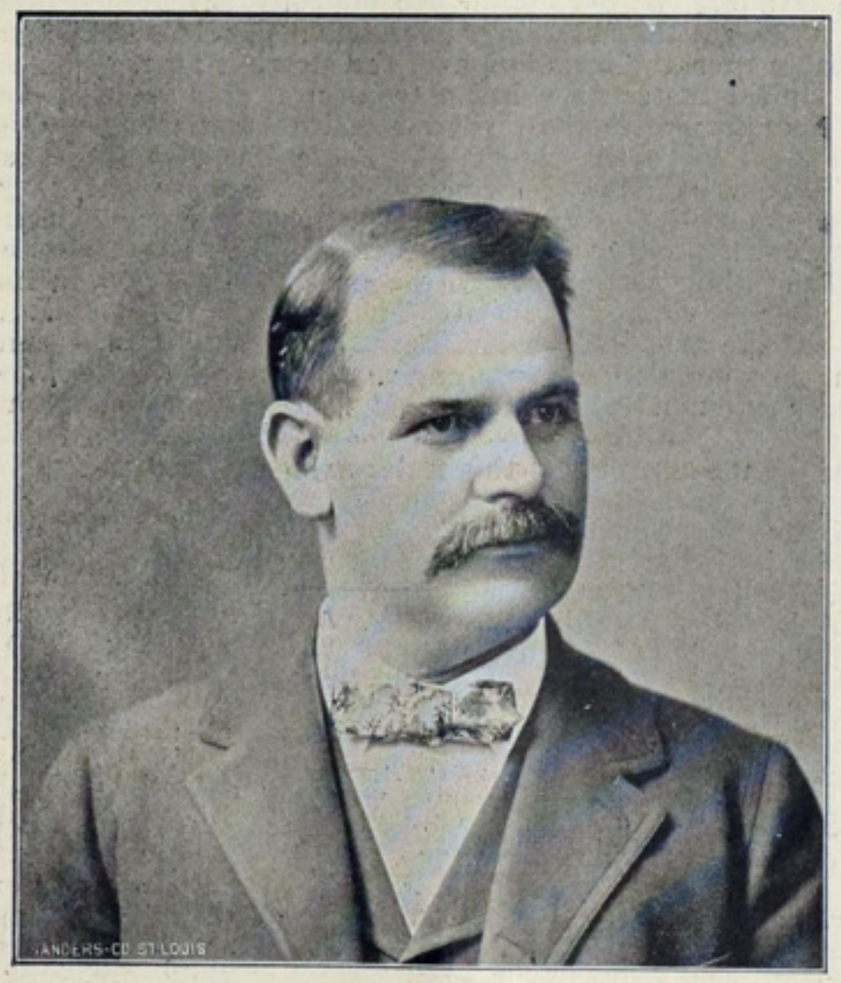
BOILER MANUFACTURERS.

THEIR ANNUAL CONVENTION IN CLEVELAND THE MOST LARGELY ATTENDED AND MOST SYSTEMATICALLY CONDUCTED OF ANY HELD IN YEARS.

Mr. H. J. Hartley of the Wm. Cramp & Sons Ship & Engine Building Co. of Philadelphia was reelected to the presidency of the American Boiler Manufacturers Association at the eleventh annual convention held at Cleveland this week. Other officers elected were: First vic-president, D. Connelly of Cleveland; second vice-president, John O'Brien of St. Louis; third vice-president, J. Don Smith of Charleston, S. C.; fourth

H. J. HARTLEY, PRESIDENT.

vice-president, James Morrison of Pittsburg; fifth vice-president, M. H. Weidner of Chattanooga, Tenn.; secretary, J. D. Farasey of Cleveland, and treasurer, Richard Hammond of Buffalo. The report of the treasurer showed tne organization to be in a flourishing condition financially and the secretary reported the accession during the year of thirteen new members, bringing the total up to sixty-seven. There were, however, more than 100 boiler manufacturers in attendance at the convention, in conse-

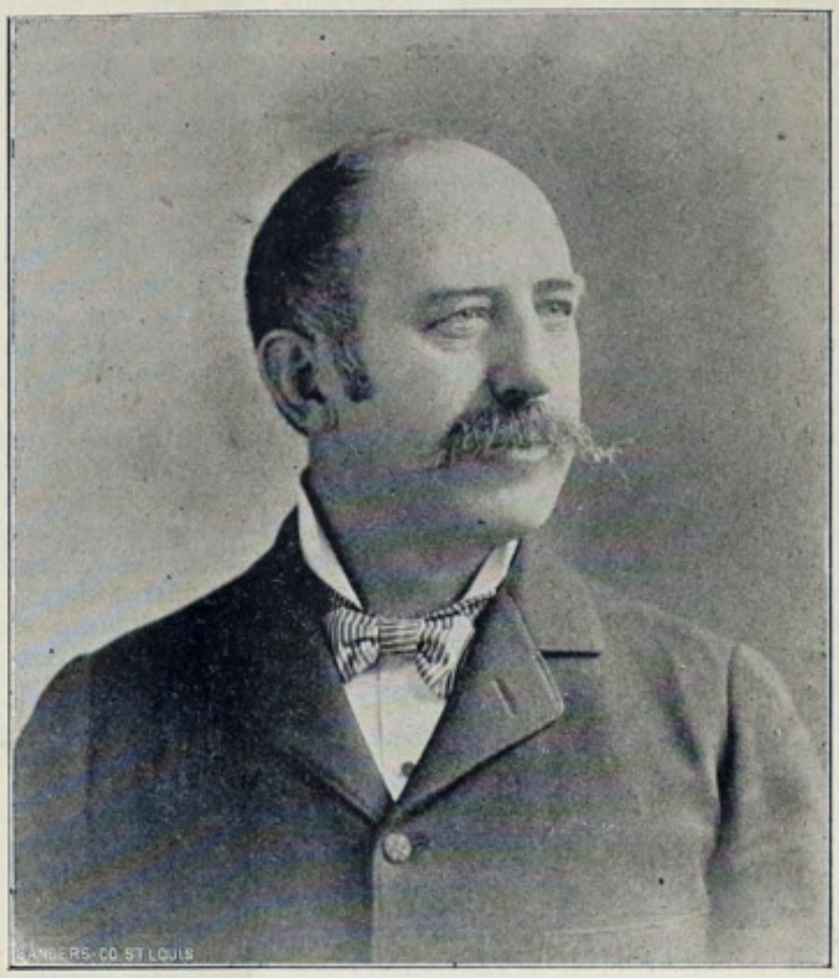


D. CONNELLY, FIRST VICE-PRESIDENT.

quence of the invitation to meet with the association which was sent to each of the 500 boiler manufacturers in the United States and Canada. The topical discussion was far more interesting than usual, and not only was the convention better attended than any held for four or five years, but it was more systematically conducted. An effort was made in executive session to bring about some kind of an agreement as to prices, but it could not be learned that anything definite had been accomplished.

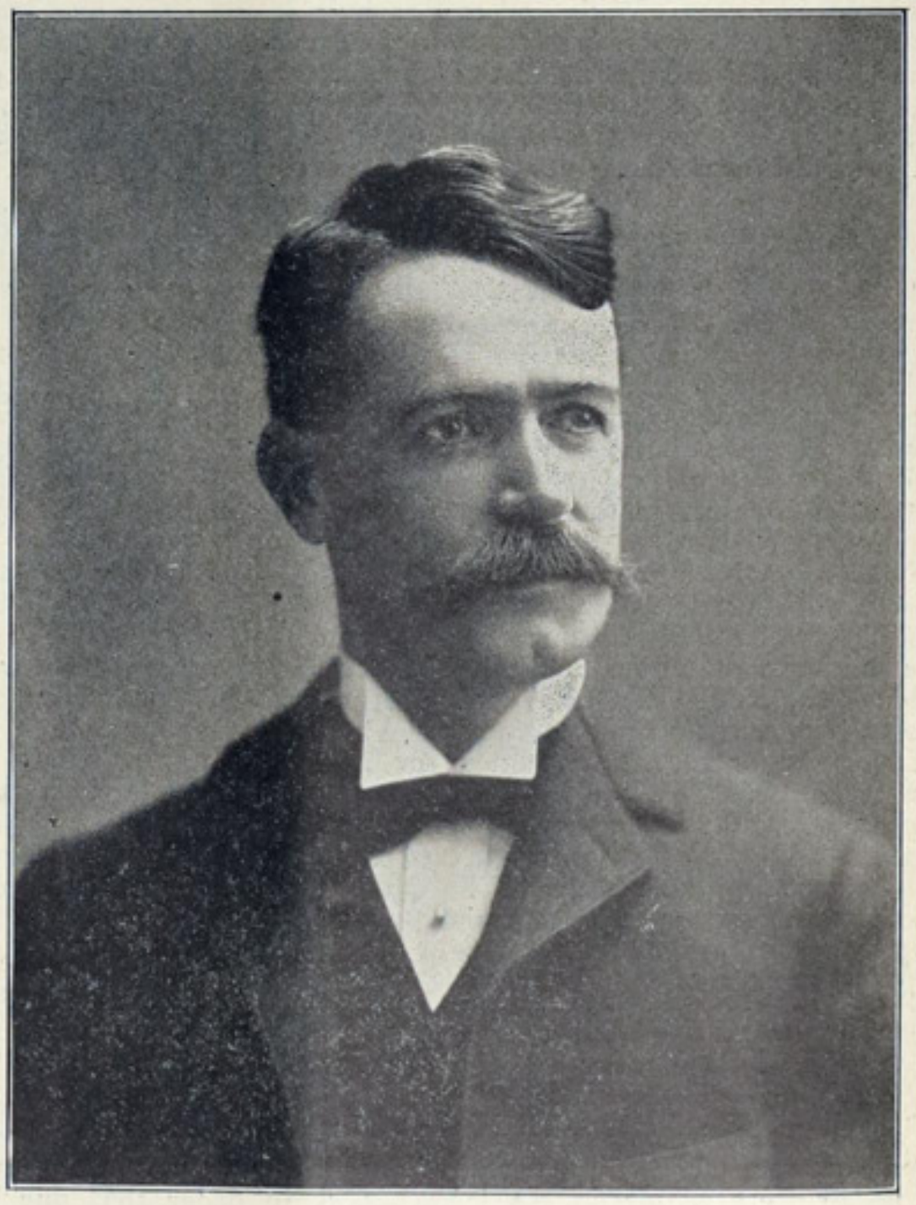
The delegates and the half a hundred ladies who accompanied them were elaborately entertained by tally-ho drives, theater parties and an excursion to the islands of Lake Erie. The local reception committee made up of almost everybody interested in the manufacture of boilers in Cleveland, was generally congratulated upon the success of their efforts to make the affair enjoyable. This was especially true as regards Mr. D. J. Champion of the Champion Rivet Co., secretary of the local committee, who gave up a great deal of time to the convention.

Among those in attendance were the following: H. J. Hartley, president, Philadelphia, Wm. Cramp & Sons Ship & Engine Building Co.; Gen. James A. Dumont, United States steamboat inspection service, Washington; S. Crawford, Philadelphia; Geo. R. Lowbard, Augusta, Ga., Geo. R. Lowbard Iron Works; Fred K. R. Case, Philadelphia, Hoopes



JOHN O'BRIEN, SECOND VICE-PRESIDENT.

& Townsend; D. Greipe, Davenport, Ia.; Jos. F. Wangler, St. Louis, Jos. Wangler Boiler Works; Louis D. Collins, Geneva, N. Y., New York Central Iron Works; T. R. Teare and M. Thomas, Cleveland, River Machine & Boiler Works; Jas. Lappan, Pittsburg, Jas. Lappan & Co.; B. G. Hearn, Cleveland; Geo. Whiting, Chicago, Scully Steel & Iron Co.; J.



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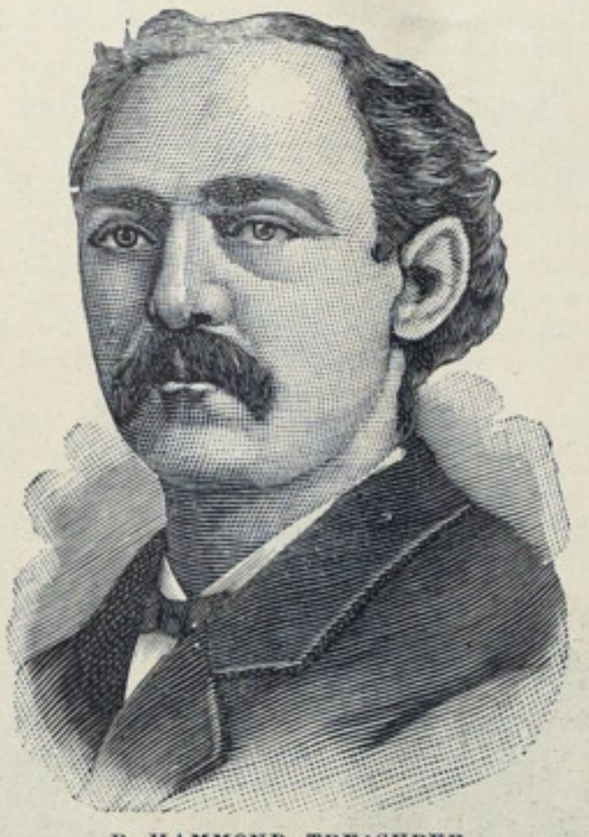

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WORK IN THE SHIP YARDS.

A recent launch at the Roach Ship Yard, Chester, Pa., was that of the steam yacht Eugenia, designed by Gardner & Cox of New York, and building for J. G. Cassatt of Philadelphia. She is 175 feet over all, 143 feet water line and 21 feet beam; triple expansion engines, with cylinders of 12, 19½ and 31 inches diameter and 21 inches stroke. Steam is generated in two Almy water tube boilers.

William E. Woodall & Co. of Baltimore, Md., have launched the steamer Brockway, building for Capt. D. S. Brockway. The vessel is 132 feet in length, 23 feet beam and 9 feet depth of hold. She will be fitted by the Campbell & Zell Co. with a compound engine with cylinders of 10 and 22 inches diameter and 18 inches stroke and will carry 150 pounds of steam.

The International Wrecking, Salvage & Submarine Co., with an authorized capital of $1,000,000, has been incorporated with headquarters at Atlantic City, N. J. Among the incorporators are Col. John E. Mehrer and William H. Keates of Atlantic City, Morris Tannhauser of Philadelphia and Eugene Schwinghammer of Washington, D. C.

The tug Joseph M. Clark has been launched by the R. M. Spedden Co. of Baltimore. The Clark, which is destined for the Norfolk, Va., tug owner of that name, is 90 feet long, 20 feet beam and 10 feet depth. Engines are of the fore-and-aft compound type with cylinders of 15 and 30 inches diameter and 22 inches stroke.

The Columbian Iron Works, Baltimore, Md., will tomorrow (Friday) launch the steel steamer Hartford, building for the New York & Hartford Transportation Co. She is 253 feet in length, 38½ feet beam, 9 feet draught, and fitted with compound engines with cylinders of 20 and 40 inches diameter and 28 inches stroke.

Frank E. Kirby of the United States army transport service, is at Cramp's yard, Philadelphia, superintending the refitting of the transport Thomas. A feature of the work of reconstruction will be the installation of two new distillers, which will increase the capacity to 200,000 gallons per day.

The Polson Iron Works, Toronto, Canada, will enlarge its plant by the addition of 7 acres. The firm is negotiating for several contracts for the construction of lake freight steamers of Welland canal dimensions.

The Wolff & Zwicker Iron Works, Portland, Ore., has fitted new engines in the twin-screw propeller Nahcotta and the speed of the vessel has materially increased in consequence.

The Morse Iron Works, New York City, has secured the contract for refitting the army transport Logan. Their bid for the work was $230,000.

William Rogers of Bath, Me., builder of the barge New York, has laid the keel for a five-masted wooden schooner.

IMPROVEMENTS AT THE CRAMP YARD.

Mr. H. J. Hartley, one of the directors of the Wm. Cramp & Sons Ship & Engine Building Co., speaking to a representative of the Marine Review of the improvements now being mapped out at the big Philadelphia yard, said:

"We have hardly determined to just what extent improvements will be made. We have had the new property for only a few days now, despite the newspaper statements which credited us with having secured it long ago, and so we will not know the exact extent of our new operations until the survey now in progress is completed. The land approximates 8 or 10 acres, and it will enable us to put in at once another 700-foot slip. Our new dry dock will be at least 750 feet in length, and if it does not encroach on the street will probably be fully 800 feet—large enough to take in two vessels. For one thing, we shall erect on this property a new machine shop, which will be modern in every respect. The equipment of machine tools will be similar in a general way to that in the present machine shop, but the tools will in most cases be larger. Erecting shops will also be built in the territory just annexed."

Referring to changes of equipment at the present works, Mr. Hartley said: "The most important work under way at the present time is the installation of three electric traveling cantilever cranes by the Brown Hoisting & Conveying Machine Co. of Cleveland. We have also within the past few weeks put in an air plant and a full equipment of pneumatic riveting machines for use on hulls. We have had the Boyer chipping and caulking hammers in use in the shops for some time, but this is the first attempt to use pneumatic tools of the type manufactured by the Chicago Pneumatic Tool Co. on hulls.

"We have about 5,000 men at work at present," said Mr. Hartley, "and a little later this force will be materially increased. Our great difficulty is in securing material. Just to show you how present conditions in the material market have affected us, I may say that we had expected to launch one of the Russian war vessels, which we have on the stocks, ere this, but such delays have been experienced that she will not go into the water before some time in September. Oh yes, I imagine that our firm will assuredly bid on at least one of the cruisers of the Denver class, for which bids are to be opened in November."

"How about the report that the Cramp company will secure the property lately operated by the Hillman Ship & Engine Building Co."?

"Well, the Hillman yard is located very conveniently to the Cramp dry dock and could undoubtedly be utilized to good advantage. I believe that the Cramp company has made an offer for the plant, but whether or not this has been accepted by the creditors of the Hillman corporation I do not know."

In speaking of the ultimate effect of American competition in the ship building market of the world Mr. Hartley said: "I cannot but believe that within a few years British ship builders will find in Americans a formidable competitor, and that moreover they already realize this. The enormous increase in prices of material in this country, amounting in many cases to fully 100 per cent., has proven a drawback to attempts on our part to invade the foreign market at this time, but the great number of new and unoperated furnaces now being placed in blast causes me to incline to the opinion that this will be but a temporary condition. When prices of material return to a normal basis the situation will be different. England cannot compare with us in cheapness of raw materials; iron ore supply is becoming a problem of increasing perplexity to her business interests, while we, on the other hand, have ore to last for a great period of years. The American workman receives wages only about 20 per cent in excess of the British, and he more than compensates for it in added efficiency, while American ship builders are not subservient to the disastrous trades-union tyranny that prevails in Great Britain."

Mr. Hartley said that the International Navigation Co. is considering the matter of placing a contract for a steamer to replace the Paris, and then the conversation turned to the present-day tendency toward slower ships. "The Kaiser Friedrich and the Kaiser Wilhelm der Grosse," he said, "were contracted for several years ago, and I believe that a great change in public sentiment has taken place since that time. It is not strange that the Oceanic and the new American liners for which we have the contract will be slower vessels than some of their predecessors. I believe that the whole tendency of the twentieth century will be toward less speed and greater comfort in travel. Then again, the maintenance of high speed is an excessive strain on a vessel, while the fact that there is little money in the operation of passenger vessels makes it a foolish policy to expend several hundred tons of coal simply to gain one day's time."

MACHINE TOOLS FOR NAVAL SHOPS.

The navy department has been a heavy purchaser of machine tools during the past year, and the fire at the Brooklyn navy yard has considerably increased the aggregate of these purchases of late. The first consignment of orders for machinery to replace that destroyed by the fire was placed last week and amounted in the aggregate to fully $40,000. Delivery was a prime factor. In the case of an 8-foot boring mill, the contract for which went to Manning, Maxwell & Moore of New York, delivery was promised within five days. The Niles Tool Works Co. of Hamilton, O., has received a very handsome order from the department, aside from the lot previously mentioned. Included in this invoice will be five lathes ranging from 32 to 48 inches, a 63-inch lathe, a large horizontal boring mill and an 18-inch and a 20-inch slotter. Chief Engineer J. A. B. Smith, formerly at the Norfolk (Va.) navy yard, and one of the most efficient men in the service, is now in charge of the engineering department at the Brooklyn yard, and his administration of affairs is characterized with refreshing energy. He has made provision, for instance, for the installation of as many as possible of the large tools just ordered without awaiting the completion of the new main machine shop. The new shop will scarcely be completed short of a year, but Engineer Smith will have specifications for the heavy equipment and also for woodworking machinery ready within six weeks.

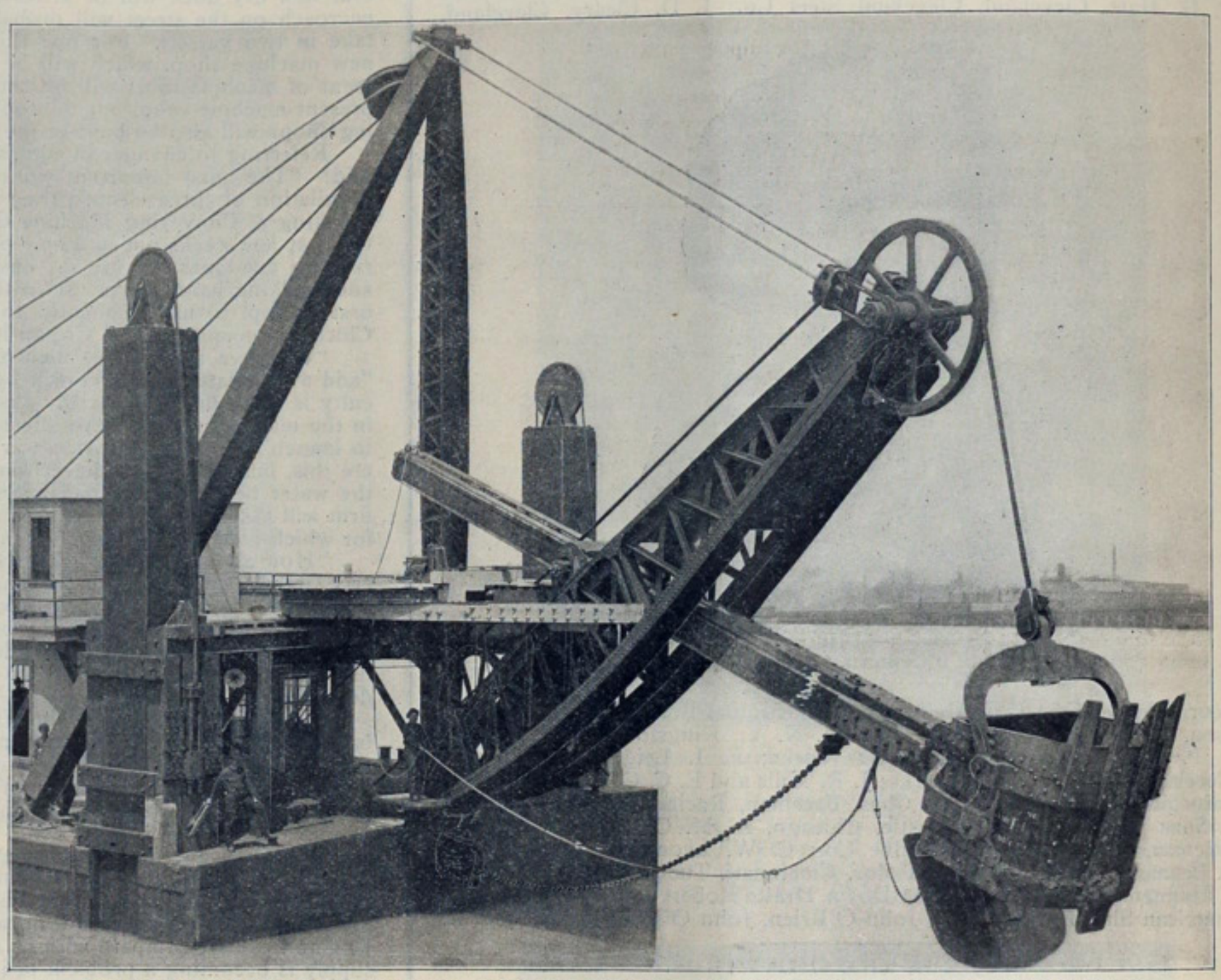
It is understood that the New York Ship Building Co., recently organized, has made a purchase of eight acres additional of land at Camden, N. J., and will erect thereon 200 dwelling houses for the use of its employes.

DIPPER DREDGE PAN-AMERICAN.

A MACHINE THAT IS CLAIMED TO BE THE LARGEST OF ITS KIND EVER CONSTRUCTED—OF 12 TONS DIPPER CAPACITY—OWNED BY HINGSTON & WOODS OF BUFFALO.

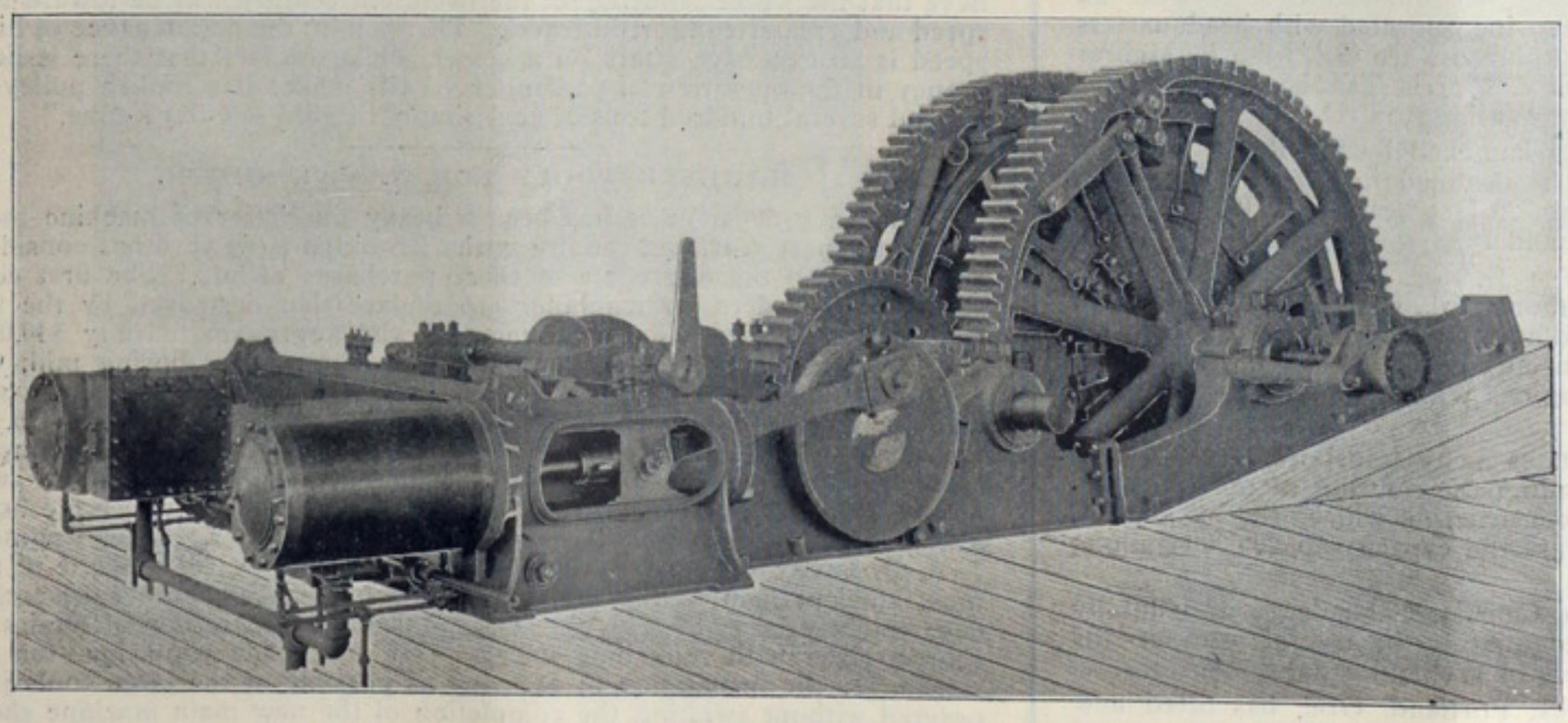
Through the courtesy of the Engineering News of New York, the Review is enabled to present a complete description and a few very clear illustrations of the dipper dredge Pan-American, recently completed for Hingston & Woods of Buffalo, N. Y., for use on the great lakes. This is claimed to be the largest dredge of its type ever constructed. It has a dipper with a capacity of 8¼ cubic yards or about 12 tons. While intended for service on the great lakes, the dimensions of the hull are such that the dredge can go through the Welland and St. Lawrence canals, and can easily be fitted with tanks for salt water service. The hull and general arrangement of the dredge were planned by Mr. William E. Hingston, and the machinery was designed and built by the Bucyrus Co. of South Milwaukee, Wis. The Engineering News acknowledges indebtedness to Mr. Hingston and to Mr. A. W. Robinson, M. Am. Soc. C. E., chief engineer of the Bucyrus Co., for the information from which this description has been prepared.

The hull is built of white oak and Oregon fir, and is 136 feet long, 42 feet 3 inches beam, and 13 feet 6 inches deep. There are four longitudinal steel trusses. Two of these are spaced 26 feet apart, or on the line of the cabin work, and are each 119 feet long and 25 feet high. The total height from the keel to the tops of these trusses is 32 feet. The other two trusses are located at the sides and are each 119 feet long and 13 feet deep, or just the depth of the hull. The sides of the hull are 8 inches thick, and the bow is 12 inches thick. The bottom and sides are connected by 136 wrought-iron knees. Altogether, including the material in the spuds, there entered into the construction of the hull 157,000 feet B. M. of fir, 70,000 feet B. M. of oak and 23,000 feet B. M. of pine, or a total of 250,000 feet B. M. of timber.



VIEW OF FRONT END OF DREDGE PAN-AMERICAN, SHOWING A-FRAME, BOOM AND DIPPER CONSTRUCTION.

There are four spuds, two at the bow, each 4 by 4 feet, made up of four 24 by 24 inches Oregon fir timbers, 50 feet long, and two at the stern, 2 by 2 feet in size. The bow or forward spuds are raised and lowered by power from the main engine by means of wire ropes. There is a large sheave on top of the spud and another fitted in a slot through the spud about 12 feet from its lower end. There are two ropes to each spud, both connected to opposite ends of one drum, and the ends of the rope are attached to a fixed point outside the spud, and provided with means for adjustment. The rope passing around the sheave near the lower end of the spud serves to raise it, and the other rope passing over the top of the spud serves to force it down with great force and thus "pin up" the dredge.



VIEW OF 18 BY 24-INCH DOUBLE HOISTING ENGINE—DREDGE PAN-AMERICAN.

It will easily be seen that with dredges of the dipper type it is very necessary to pin them up securely, so that a considerable portion of the weight of the hull at the forward end rests upon the spud upon the bottom, in order to hold the dredge against the digging thrust of the dipper. The "pinning up" power of the Pan-American is easily able to lift the end of the hull with all of its machinery upon it 2 feet in the water, which is equal to sustaining a weight upon the spuds of about 130 tons. When the spuds are off the bottom the hull is "down by the head" several feet, due to the great weight of the machinery on the front end. In other words no attempt has been made to distribute the weight upon the hull so that it will float on an even keel. In fact it would be a disadvantage to do so, as the extra weight is needed at the forward end to hold the spuds down, and when the dredge is pinned up she is in the best position for work. The A-frame and boom are of steel, and are clearly shown in the view of the front end of the dredge. The A-frame is 53 feet high, and the boom is 53 feet long, and weighs 30 tons. The dipper handle is of wood, reinforced with steel plates, and, as already stated, it carries a dipper of 8¼ cubic yards capacity and weighing 16 tons. As the dipper is operated by wire rope, single whip, it is expected that the dredge will work very rapidly. She is guaranteed, in fact, to make a full revolution with a load from water 25 feet deep every 40 seconds, which is a capacity of from 5,000 to 6,000 cubic yards per ten-hour day.

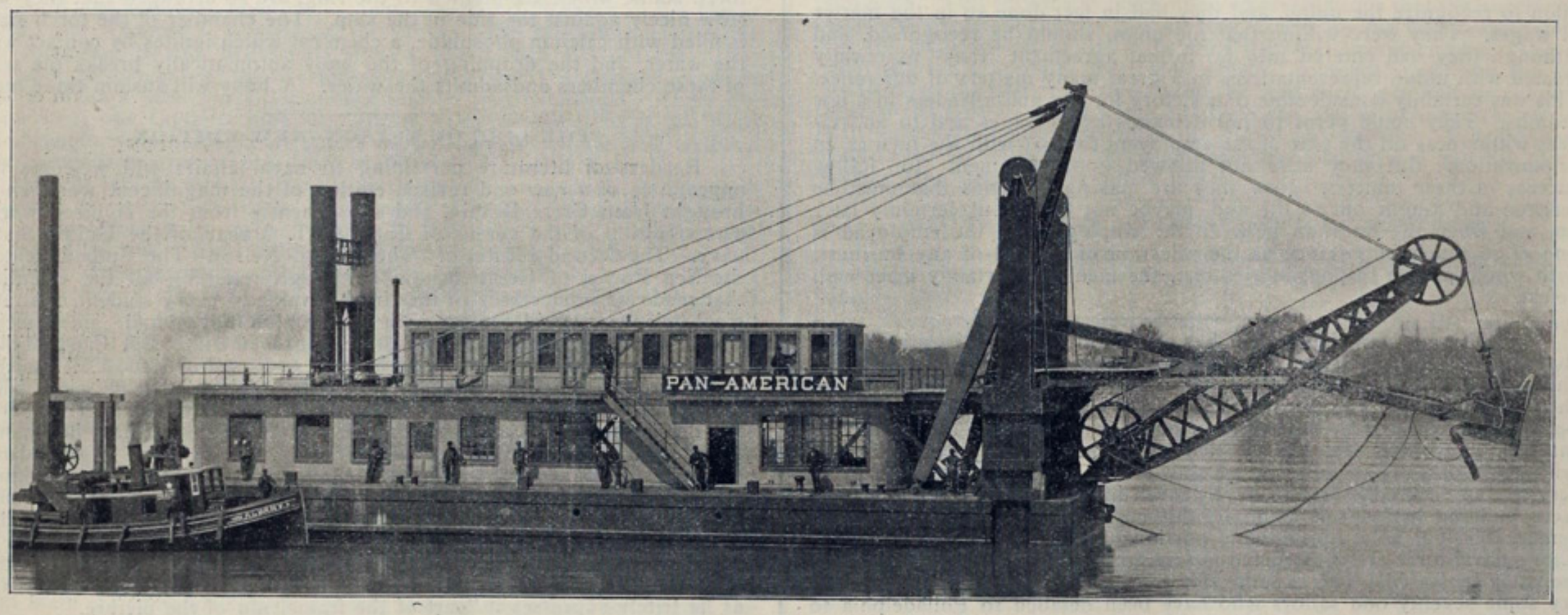
Perhaps the most distinguishing feature of the dredge is the use of the single-part wire-rope hoist instead of the chain hoist for the dipper. The reason for this innovation, as stated by the builders, is as follows. As dipper dredges increase in size a hoisting chain that will withstand the necessary strain becomes exceedingly heavy, and it is also necessary to run it at great speed in order to make time. This necessitates a great waste of power and wear and tear of the chain and sheaves. A hoisting chain, to do the work of this great dredge, would be three parts 2½ inches in diameter and 275 feet long, and would weigh about ten tons. It would require four sheaves, which should not be less than 6 feet in diameter, and would probably weigh about two tons each, or a total of eight tons. It will readily be seen that the friction and wear and tear on this chain would be enormous, and the horse power required to move it would be considerable. Moreover, when such a chain breaks, as it sometimes does without notice, it is a serious task to fish it up again. So much for the disadvantages of the chain hoist for very large dredges.

Attempts have been made to substitute wire rope for chain by using three parts of rope and binding them around the sheaves in the usual way, but this method has not been altogether satisfactory, as the frequent bending and friction of the ropes against each other caused them soon to wear out. In 1890 Mr. John Kennedy, chief engineer of the harbor commissioners of Montreal, introduced the first wire rope dredge for large and heavy work on the single rope plan. This dredge was designed for digging hard material, such as shale rock, etc., in 40 feet of water, and had a direct pull of

120,000 pounds. The results obtained with the dredge were highly satisfactory, and three others have since been built which are almost its exact duplicates. It has been found that these dredges all possess exceptional speed of working, as compared with chain dredges, especially in deep water, for the reason that the dipper can drop so much more freely with the direct wire rope than is the case when it is required to overhaul three parts of chain. With the wire rope it falls almost with the speed due to gravity, being restrained but slightly and checked up at the right moment as it nears the bottom, whereas with the chain its descent is comparatively sluggish.

Another incidental advantage of the wire rope over the chain is the angle of lead of the pull upon the dipper. It will readily be seen that it is desirable to have this lead as far out as possible in digging, in order that as large a component of the strain as possible may go into a push upon the scoop and not into compression of the dipper handle. In the case of the Pan-American, the lead of the rope is 20 per cent. further out on the boom than if the usual three-parts chain were used for the same length of boom. This is due to the fact that a single sheave of large diameter is used at the extreme point of the boom, instead of two sheaves, mounted as usual, back of the end of the boom. An additional advantage of the wire rope over a chain is that, after it becomes worn, it gives warning of a break by some of the wires breaking. In this way its failure is a gradual one and gives opportunity to replace the rope, which can be done very quickly. A chain, on the other hand, breaks without warning, and lets the dipper and a large portion of the chain go to the bottom, and in such large machines it requires many hours work and delay to raise and repair.

The hoisting rope of the Pan-American is extra flexible plow steel, 2½ inches in diameter, and turns over sheaves 8 feet in diameter. It is operated by an 18 by 24 inch double high pressure engine, a general view of which is also printed herewith. It will be seen that the engines are of very substantial construction, having the drum and gearing all self-contained in one pair of frames. The main hoisting gears are 12 feet in diameter, 12 inches face, and 4½ inches pitch, and power is applied to them by means of a steam thrust operating two band frictions. The friction bands are 12 inches wide and are lined with wood blocks, and the friction housings are also of cast steel, turned to a perfectly smooth surface. The steam cylinder for applying the friction is so designed that the power can be applied gradually and slipped to any desired degree. This is done by special arrangement of the valve motion, whereby the movement of the plunger connected to the cylinder follows the movement of the hand on the operating lever and coincides with it. Besides the main hoisting engine there are a 10 by 14 inch double swinging engine and a 9 by 12 inch double backing engine. A separate engine runs the electric plant, and there are a number of steam thrust cylinders for various operations. In fact the whole of the more important operations of the dredge are controlled by steam so that the labor of the operators is reduced to a minimum. The builders assert, in fact, that despite its great size this dredge will be handled with less physical effort than most small old-style machines. Steam is supplied to the various cylinders by a pair of 8½ by 12 inch return-flue marine boilers, operating under 150 pounds steam pressure. These boilers were built by Farrar & Treffts of Buffalo, N. Y. The coal bunkers have a capacity of 150 tons. To indicate further the accommodations of the dredge, it may be stated that she is provided with state rooms, office, bathroom, and a dining room for forty persons, and is lighted by electricity throughout. The Pan-American is now at Portage Lake, where her owners have a large contract for dredging.



GENERAL VIEW OF DIPPER DREDGE PAN-AMERICAN—12 TONS DIPPER CAPACITY.

Following closely upon the rejection of the steamer Kaiser Friedrich by the North German Lloyd Co., on account of the required high speed not being attained by the vessel, comes the announcement that the steamship company has ordered another vessel from the Vulcan works of Stettin (Schichau of Elbing built the Friedrich), that is to exceed the Kaiser Wilhelm in size and speed. The new ship is to be 700 feet long, 70 feet in beam, and is to make 23½ knots with engines of 36,000 horse power. The new ship will thus be slightly larger and faster than the Deutschland, building for the Hamburg-American line. She will be of practically the same length and 2 feet more beam than the White Star liner Oceanic, but her displacement, on account of the fineness of her lines, will be less.

NEW ORLEANS SHIP YARD.

MR. ROBERT MORRIS, WHO HAS BEEN VISITING VARIOUS SHIP YARDS AROUND THE COUNTRY, ANNOUNCES THAT HE HAS THE BACKING FOR THE ESTABLISHMENT OF A PLANT AT THE SOUTHERN PORT.

The Marine Review noted some two or three months ago the fact that Mr. Robert C. Morris of New Orleans, manager of the southern department of the National Association of Manufacturers, was making a tour of the principal ship yards of the eastern seaboard and the great lakes, and also outlined something of his plans for the establishment of a ship building and dry dock plant near the mouth of the Mississippi. Mr. Morris has kept resolutely at work ever since and he now claims that his scheme is assuming tangible shape. In a letter relative to his plans he says in part:

"I have visited all of the principal ship yards in the country, with the exception of those on the Pacific coast, and have met with the most flattering encouragement. Almost without exception the heads of these large ship yards I have visited, have given me to understand that this is a good move at the right time, and, above all, that it is just the proper location. We do not want to stop at half a plant but propose to put up a first-class plant, to build anything that is required, either by the government or private corporations. After a month's hard work I was successful in securing one of the best-known and most practical ship builders in this country to take charge of this big plant. This is the all-important part of such a venture at this time, when all the ship yards in the country are overcrowded with work. They will not be ready for new contracts for from one to three years, especially if the ship subsidy bill passes, which it is quite sure to do. In this connection I would like to say I had a talk with Senator Hanna while in Cleveland before he sailed for Europe, and in discussing this matter he showed every confidence in the passage of the bill, as did also Gen. Spalding, assistant secretary of the treasury, upon whom I called while in Washington. This bill, of course, would not only make the New Orleans ship yard an assured success, but would make it absolutely necessary to establish others throughout the country at once.

"I have some substantial people back of me, and we will be capitalized for from $2,000,000 to $5,000,000. Although summer weather and vacation times are a drawback, I am pushing the matter very successfully and expect to be on the ground before long with the gentleman who is to take charge of the business, for the purpose of selecting a suitable location for the plant, which will be first-class in every department. I have in my possession several excellent options on suitable property, and will undoubtedly make a selection from one of these. We will build our machine shop, traveling cranes, ways, etc., and then construct a floating dry dock on the ground. Meanwhile we will accomplish what some skeptics have said was not possible in our hot climate, viz., the organization of a large force on this construction, which would be followed up by new vessels, by repair work and by the construction of a second dock.

"We will have sufficient capital to build vessels for sale, should we not have any contracts for new work by the time we are ready, so that should this be possible we can keep our force steadily busy and show the outside world that we can build ships in New Orleans. I have been giving this my earnest effort for a year past and exclusively for three or four months, and am quite satisfied with the progress thus far. The people of New Orleans are very kindly disposed, and although I came here for only this particular purpose, yet I have found people willing to invest in several other enterprises which I cannot refer to here, but am helping out all I can, that New Orleans may get the benefit of all I can influence in that direction."

The steamer Kaiser Friedrich, recently rejected by the North German Lloyd Co. by reason of her failure to meet the guaranteed speed requirements, has been returned to her builder, F. Schichau of Elbing, Prussia. The vessel originally cost $2,250,000, and about $250,000 was afterward spent on her by the Lloyd company for plate and costly utensils and fittings. The Friedrich goes, for the time being, to Elbing. It is not expected that she will be obliged to wait long for a purchaser, in view of the enormous transatlantic traffic.

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The labor leader, sometimes credited with great achievements, is certainly more often open to criticism on account of very poor judgment. A case in point is the trouble of the past week on the ore docks controlled by M. A. Hanna & Co. at Ashtabula. Everybody who is in any way connected with lake commerce knows that this firm and the various interests which it represents has always been very liberal in its dealings with labor, so that unureasonable demands from labor in their case, especially in a time of such great activity as now prevails, is decidedly unfair. But putting this consideration aside, let us look at the disadvantages from their own standpoint of the position taken by the leaders of the ore shovelers at Ashtabula in such an unreasonable demand as the removal of the superintendent of the docks. When navigation opened this year the managers of the dock companies knew that the men were organized or were being organized at all Lake Erie ports. The first move of the union was to ask for higher wages and their requests were granted. Then it was evident that the dock companies would be called upon to recognize the union, and they had in fact done so in the matter of wages. They were willing that the union should be recognized, and although they had entered into no formal agreement they practically treated with union representatitves in a great many matters of difference. This was certainly considerable of a victory for the union leaders in a few months. They could point to full demands as to wages and to an evident willingness on the part of the employers to treat with the men as an organization. But they have not allowed good judgment to follow success in these matters. Now they are making demands that must be resisted and fought out to the end, maybe not today but certainly later on, and when the question between the employer and the employed is one of so much importance as the selection of a head of any business, with whom all the responsibilities rest, the men will certainly meet with defeat.

The Russian navy department has one feature of administrative policy that would seem worthy of emulation by other naval powers. At every ship yard where a naval vessel is under construction for the Russian navy, there is stationed a detachment of the sailors who will in all probability be assigned to duty on the vessel in question when she goes into commission. The men are thus enabled to become thoroughly acquainted with every part of the vessel which they are to man, and the efficiency of service thus secured is said to have proven highly satisfactory. If Russia were building her vessels at home, this custom would not be especially remarkable, but as a considerable portion of the vessels comprising the Czar's naval force are constructed in foreign yards, the expense is proportionately increased. The expense, for instance, of sending to this country some seventy odd sailors who have been detailed to Philadelphia to watch the construction of the battleship and cruiser now building at the Cramp yard, will be no small item. Twenty-nine of the sailors have already arived and about forty more are expected in September.

Commenting on the great advances in prices that have been made in all branches of the steel and iron industry throughout the United States, the London Statist says that the famine in pig iron, suggested as a possibility fifteen months ago, is now rapidly approaching. Iron and steel seem to be in practically unprecedented demand in all of the European countries, and the cessation of shipments of pig iron from America is being severely felt. The scarcity of raw material is likewise a feature which is forcing itself upon the attention of producers of pig. The narrowness of American stocks of pig iron is closely paralleled by the statement that there are no stocks in the makers' hands in Great Britain. Consumers everywhere are complaining they cannot obtain supplies, the American supply is wholly stopped, and the stocks in public stores are not more than three or four weeks' consumption. Two features which might operate to curtail the upward movement of prices, those of a collapse in the ship building industry and a serious international disturbance, are not by the Statist regarded as probable.

In the last issue of the Review was printed a notice of an approaching examination for draftsmen in the service of the navy department. With ship building operations constantly increasing in all parts of the country, it has been found quite difficult to retain a sufficient force of competent men in the government service. Rear Admiral Philip Hichborn, chief constructor of the navy, has repeatedly recommended of late that higher salaries be paid to the draftsmen in the employ of the department, and there is little doubt that some serious consideration of this recommendation will ere long be found imperative, as it is daily becoming more difficult to retain the services of the draftsmen and designers attached to the bureau of construction and repair, inasmuch as private ship building corporations are just now sorely in need of help of this kind, and salaries have gone up accordingly. Higher salaries in private ship yards have resulted in many resignations from the government forces connected with the bureau of construction and repair and with the various navy yards.

Rear Admiral A. S. Crowninshield, chief of the bureau of navigation, navy department, has gone to England upon an important mission. The department has practically decided to abandon the use of receiving ships for sailors awaiting assignments to vessels on sea duty and will construct shore quarters. Rear Admiral Crowninshield's trip abroad is for the purpose of inspecting the English naval barracks, which are the finest in the world. The substitution of the English system will unquestionably prove beneficial, inasmuch as the plan heretofore followed in the United States has given rise to much dissatisfaction, owing to the expense involved and the discomfort which has attended life on board ship, the quarters in nearly every vessel which has been used being cramped and inconvenient. Finally it has been necessary to keep on such receiving ship a complement of officers and a crew of experienced sailors, and with the inadequacy at present prevailing in the navy these men cannot well be spared.

In reply to the inquiry of a correspondent who recently asked for plans of the New York Ship Building Co.'s plant, the construction of which has just been commenced at Camden, N. J., an officer of the company is thus quoted: "Not for $100,000. The firms with which we expect to compete would give that much to know what we are going to put here." The Review mentioned last week that the contract for the steel work that will enter into new buildings of this plant had been let to the Pottstown Bridge Works of Pottstown, Pa., in which some of the officials of the ship building company recently acquired an interest. The entire contract is for 10,000 tons of material, and the Pottstown works will have to be operated double turn with 500 men for a year in order to carry out the work. The bridge company will also construct the piers for the new company.

According to recent reports, the Franklin life buoy, the invention of Rear Admiral Philip Hichborn of the bureau of construction and repair, the navy department, is constantly gaining in favor. The buoy is now in use on all the vessels of the United States navy and on many of those of foreign powers. The Franklin buoy is a hollow, air-tight metallic ring, provided with two automatic torches, intended for use at night. The torch staffs, which are pivoted to the ring, are so arranged that they will stow nicely against the side of the ship. The chamber of the torch staffs is filled with calcium phosphide, a chemical which ignites by contact with the water, and the dropping of the buoy automatically breaks the seals of these chambers and admits the water. A buoy will sustain three men.

THE LIFE OF NELSON—NEW EDITION.

Readers of literature pertaining to naval affairs will welcome the appearance of a new and revised edition of the magnificent work which brought from Great Britain, and subsequently from the civilized world, a recognition of the genius of Capt. A. T. Mahan of the United States navy. The second edition of "The Life of Nelson—The Embodiment of the Sea Power of Great Britain" although retaining all the essentials that made its predecessor of inestimable value to every student of strategical science, is still replete with minor alterations and amendments which in almost every case constitute improvements. But Capt. Mahan takes a stand which is likely to be heartily endorsed by almost all students of the great English commander, when it is claimed that although additional letters may from time to time be found, they will alter but little the details of facts regarding the sea fighter, and that henceforth biographies will contrast one with another, not in point of abundance of material, but as portraits do, according to the ability of the workmen to reproduce from the original before him an impression of the man which shall be at once true, full and living. It is therefore patent that Capt. Mahan is right in his contention that the minor changes made in the text as given in this new work does not affect in the slighetst degree his previous presentment of Nelson's character and conduct. They are, as he tritely expresses it "part of the frame, not of the picture."

Of the book itself any mention is almost superfluous. Its value was recognized almost instantly throughout the entire world of naval science and it will remain for all time as an authority and a classic. The biography was undertaken, as is well known, as an essential to the completeness and rounding off of the author's discussion of the "Influence of Sea Power," that he might present a study from his own view of the man who in himself summed up and embodied the greatness of the possibilities which sea power comprehends—the man for whom genius and opportunity worked together to make him the personification of the navy of Great Britain, the dominant factor in the periods treated of in the author's previous works. He presents Nelson not merely as a personality or a career but a great force or a great era concrete in a single man. The aim of the writer in the preparation of the work was to make Nelson describe himself—tell the story of his inner life as well as his external actions. For the accomplishment of this he adopted the only infallible method. He made a careful study of Nelson's voluminous correspondence, analyzing it, in order to detect the leading features of temperament, traits of thought and motives of action, and thus he conceived within himself by gradual familiarity, even more than by formal effort, the character which he has succeeded in revealing so admirably. To convey his own impressions to others the author has adopted equally novel and ingenious methods. On the one side he presents a portrayal of the daily life of his hero; on the other he groups incidents and utterances without reference to time or place, which serve to emphasize particular traits and particular opinions. As the result of it all, we have a work that will forever hold a prominent place in historical literature. It confirmed the verdict of the author's genius which his work "The Influence of Sea Power Upon History" had won, commending him for all time to the intelligent and thoughtful consideration of a world wide audience, and finally it fully justified the interest whose existence was well reflected by the action of the reviewers on the London daily papers, who, when the first edition of the Life appeared, sat up all night in order to prepare reviews for their respective publications.

The new edition, which is just from the press of Little, Brown & Co., Boston, speaks for itself. Typographically it is representative of the highest excellence of modern achievement. Pictorially it is equally notable, the illustrations comprising about a dozen handsome engravings and a large number of maps and battle plans.

Unauthenticated reports from Newcastle-on-Tyne are to the effect that on her initial trial the first of the torpedo boat destroyers fitted with the Parsons steam turbine and building for the British government attained a speed of only 25 knots.

FROM THE NAVY DEPARTMENT.

MATTERS TALKED OF IN WASHINGTON—THE NEW REGISTER—PROPOSED CHANGES IN BROOKLYN NAVY YARD—LEAGUE ISLAND DOCK.

Washington Bureau Marine Review,
1345 Pennsylvania Avenue,
Washington, July 26.

Notable changes in the rank and position held by officers of the navy are shown in the new naval register, consequent upon the personnel act of the last congress. For the first time since the civil war, the register contains no list of engineers, this corps having been merged with the line. The rank of commodore has disappeared and instead of six rear admirals as the January register reported there are now eighteen with Rear Admiral McNair, superintendent of the naval academy at the head, and Rear Admiral Benjamin F. Day as the junior officer. At the head of the register is Admiral George Dewey, this rank and office not having appeared there since the death of Admiral Porter, ten years ago. More space is given to the admiral in the register than to any other officer. With the grade of commodore no longer existing that of captain is now the next highest to rear admiral, and of the captains there are seventy in the navy, headed by Capt. Alex. H. McCormick with Capt. Albert S. Barker, late commander of the Oregon, as second in rank. In this list there are a number of engineers who become a part of the line in the new order of things. In the commanders' list there are 112 officers, with Charles H. Stockton, president of the naval war college, as senior officer, and Dennis W. Mullen, who is under suspension, at the bottom. George Cowie is the ranking officer of the 170 lieutenant-commanders and Henry T. Mayo brings up at the foot. The list of lieutenants has been almost doubled and numbers now 300. Lieut. Charles C. Rogers is the senior and Lieut. Charles T. Vogelsang the junior. The remainder of the line is composed of 132 lieutenants, junior grade, and 107 ensigns. The number of officers in the marine corps also shows a decided increase since January last, when the annual register was published. There are now forty-one captains with four vacancies to be filled; forty-five first-lieutenants with numbers of places in both grades which will be filled by competitive examination from civilians.

In the last six months there were thirty-four resignations in the naval service, of which nine-tenths were cadets who had failed at Annapolis. There were twenty-seven retirements in the same period, including one commodore, one captain and three lieutenants, the remainder being staff officers. Two marine corps' officers also retired and nineteen officers of all branches of the navy died. One marine officer, Capt. Webster, was dismissed. By the signing of the peace treaty it became necessary to discharge all the volunteer officers then carried on the register, and since last January there have been mustered out two lieutenant-commanders, sixteen lieutenants, twenty-three lieutenants junior grade, thirty-six ensigns, thirty-five pay officers, two medical officers, twenty-six engineers, forty-six assistant engineers and thirty-one marine officers.

In the distribution of ships it is shown that while the Asiatic station has more vessels attached to it than any other station, the home fleet is probably more formidable because of the type of vessels. Admiral Sampson's command is composed of all ships in commission, of which three are battleships and two are armored cruisers. Under Admiral Watson at Manila there are twenty war vessels, or more than double the number ever attached to that station before. Nearly all are small ships, but there are some formidable fighters also, among them the Oregon, the two monitors, Monterey and Monadnock, and the cruisers Baltimore and Charleston.

Seven vessels comprise the Pacific fleet under Admiral Kautz, including the Iowa and flagship Philadelphia. Three vessels form the South Atlantic station, the Chicago, Montgomery and Wilmington, although the former is now on the African coast and will not remain in South American waters more than a few weeks after arrival there. On special service are nine vessels, and two are unassigned, one of which is the Olympia homeward bound with Admiral Dewey. Four wooden ships comprise the training service squadron and two are used by the Annapolis naval cadets.

Eleven ships are ranked as first rate, eighteen are regarded as second rate, including the Reina Mercedes, and practically all the others of the steel class are third rate. There are, however, over 100 vessels classed as fourth rate, among them the cruisers, yachts, tugs and other vessels of the auxiliary navy, and the captured Spanish gunboats. Six sailing vessels are yet a part of the service. There are also seven receiving ships and ten unserviceable vessels. Eleven first-class battleships are building or authorized; three armored cruisers, one protected cruiser, six unprotected cruisers and thirty-five torpedo boats.

Many important changes and improvements are about to be made at the navy yard at Brooklyn, and in accordance with a request Capt. Chadwick of the New York has submitted a report on this subject to Secretary Long. His report is based on personal surveys and observations and, if adopted, would entail an expenditure of at least $8,000,000. No action has as yet been taken on this report, which has just been received at Washington. Capt. Chadwick's idea is to remove the seawall and ground between Whitney basin and the Wallabout channel, dredge this space out to a depth sufficient for the largest warship at low tide and then build four piers out from that portion of the navy yard in the rear of the commandant's office. Each of these piers would be 400 feet long. It is believed that the navy department will reject these plans, owing to the enormous expense they would entail. The removal of several artificial islands alone would cost several millions of dollars, since the work was put down with the expectation that it would be permanent. Rear Admiral Philip, commandant of the navy yard, has a plan of his own which he feels satisfied will be the one the navy department will eventually adopt. The admiral's idea is to allow the sea wall and islands to remain practically untouched, the needed piers to be built out from the islands surrounding Whitney basin. This would still permit of the side docking of ships along the sea wall which Capt. Chadwick proposes to remove. So confident is the admiral that his ideas will be carried out that he now has the navy yard dredging machines at work removing the mud and artificial filling along the wall about the channel at the lower side of Whitney basin. A careful estimate of this plan shows the expense of building the piers would be about $3,000,000.

Bids for the construction of a wooden dry dock at League island navy yard will be opened August 5 and the contract will be duly awarded. There will, however, be a reservation in the contract, providing that if hereafter congress shall authorize the construction of a stone dry dock instead of the wooden one, the contractors shall construct it of stone accordingly. The increased expense of the stone construction shall be fixed at its cost value by a board of naval officers and a profit of 10 per cent thereon shall be allowed the original contractors. A large part of the work upon the dry dock will be the same whether it is finally determined to construct it of stone or of wood. The excavation will, of course, be the same in either case. The electrical apparatus by which the machinery of the dock will be driven will be the same, as will also be the foundation, the caissons, the bilge blocks and other parts of the dock. It is estimated that the excavation will hardly be finished before congress meets, and the other work above mentioned will not be much advanced until well into the session. There will therefore be ample time for congress to take such action as will be necessary to change the dock from the wooden to the stone one without delaying or interfering with the progress of the work. The appropriation for the timber dock is $825,000. It is estimated that the stone dock will not cost more than $1,100,000. With the united effort of the Pennsylvania delegation, supported as it will doubtless be by the recommendation of the secretary of the navy, the prospect of having a stone dry dock at League island are excellent.

On the recommendation of the naval board of construction, the secretary of the navy has increased the maximum time allowed for the construction of the six new cruisers provided for by the naval appropriation act of 1899 to thirty months, instead of twenty-four months as originally provided. This action was taken upon representations that the contractors will have great difficulty in placing time orders for the necessary material for the construction of the ships with the steel manufacturers. The invitations for proposals will still solicit competition among the ship builders in the matter of time, however, and each firm will be asked to specify the time in which it can complete the vessel. The matter of time will have considerable weight in the award of contracts. Bids for these vessels will be opened at the navy department on Nov. 1 and not Oct. 1 as has been stated in the public prints.

ACTIVE MINING DEVELOPMENT IN MINNESOTA.

One of the few newspaper correspondents at Duluth, who send out anything at all reliable regarding operations of the big mining companies, says:

"Prospecting and development work everywhere on the iron ranges of Minnesota is more active than ever before. The Pittsburg & Lake Angeline Co., well known on account of its great property in Michigan, has been at work on the eastern Vermillion range for some time past and is said to be fully satisfied with showings at its explorations. Some big things in the Minnesota ore fields are looked for from this company. The Minnesota Iron Co. (part of the Federal Steel) has of late been very active in securing additional ore lands, and has departed radically from old practices in going to the older ranges of Michigan. The company has now secured over eighty mining locations—in many cases a group of them covering but one mine—on the Menominee range alone, and has gone to the Marquette range, where it is gathering up what is available at low prices. The Minnesota company is not buying developed mines, but is taking well located and promising lands, on which it may find mines at the expenditure of little money, a process that undoubtedly will give it far better results at much less cost than the buying of developed mines at such enormous prices as are said to have been paid in some cases recently.

"The state of Minnesota has recently examined all its mineral land contracts taken in past years, and as a result some 175 of them have been ordered cancelled. Many of these as soon as cancelled have been taken up by others, and explorations are now in progress on some. The state will cancel others of the leases made out in the time of the Mesabi boom, some years ago.

"It is said here that several of the large furnace companies and steel works using Mesabi ores are determined to make their mixtures more heavily Mesabis than ever before, and that it is planned by the American Steel & Wire Co., for instance, to use 70 per cent Mesabis in its furnaces next year. There is no question that furnace ingenuity can obviate in time the difficulties that have in the past made the large use of these ores dangerous, and that the Mesabi range will furnish a larger and larger percentage of the product of Lake Superior as time goes on. Necessity, as well as the self interest involved by reason of the lower price of Mesabi and the ownership of its mines by the largest of the consumers, is driving these companies to this step."

A RECORD THAT WILL PROBABLY STAND.

The new steel barge John Smeaton of the Rockefeller fleet, recently completed at the works of Superior Ship Building Co., West Superior, Wis., established on her maiden trip a cargo record that will very probably stand for the balance of the season on the great lakes, unless it is broken by the Smeaton herself, as the vessel is the largest of the barges now in commission. The Smeaton left the cargo record distinction with the Manila of the Minnesota Steamship Co.'s fleet for only a few days. The Manila had moved from Lake Superior to South Chicago 7,399 gross or 8,237 net tons of iron ore. Then the Smeaton loaded at Duluth for Lake Erie 7,446 gross or 8,339 net tons. These are actual weights, that is with 1 per cent moisture addition to bill of lading figures. The Smeaton is 10 feet longer and 1 foot deeper than the Manila, but is a heavier vessel. Both barges were loaded to a fraction of an inch over 18 feet.

The government has decided to send the former Spanish cruiser Reina Mercedes to New York and Boston for exhibition purposes, and she will remain two weeks at each port. The board of survey which examined the Mercedes at Norfolk has reported that she can be caulked and temporary repairs made for $2,000.

ELECTRIC MOTORS.

THEIR DEVELOPMENT AN IMPORTANT FACTOR IN THE INDUSTRIAL WORLD—VARIOUS USES TO WHICH WESTINGHOUSE MACHINES ARE APPLIED.

It would be difficult to find an industry in which electricity is not becoming an important factor. Foreigners visit our factories to discover the secret of American success in the markets of the world, and attribute it mainly to improved labor saving machinery. During the last fifty years steam has revolutionized industrial methods, displacing hand labor and enabling complex machinery to be employed. The industrial world is now at the portal of another vast change. Electricity promises to effect a further radical transformation in industrial methods.

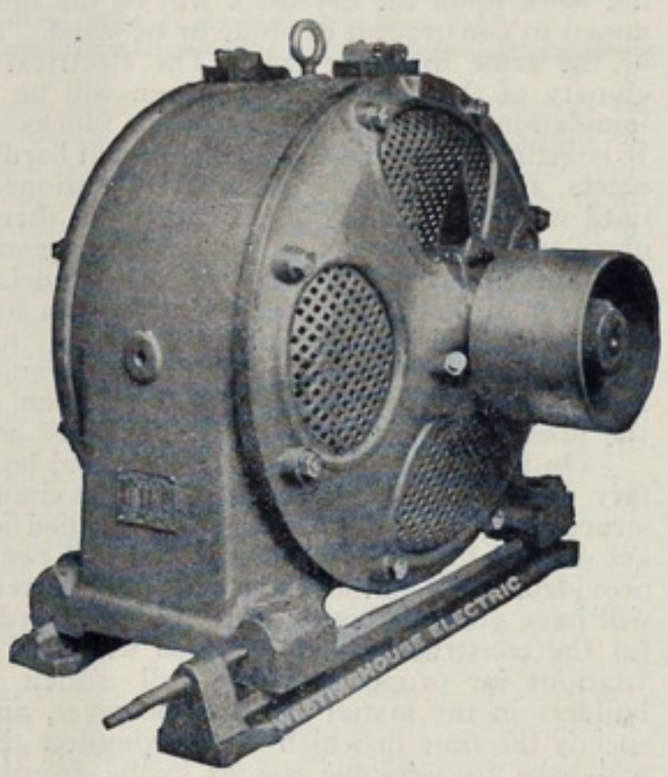


FIG. 1—WESTINGHOUSE TYPE C MOTOR.

The introduction of the alternating electric current has led to the present immense expansion of electric employment. Alternating current has had many opponents, who have viewed it as dangerous and as of no commercial value. To the credit of the Westinghouse Electric & Mnfg. Co. it must be admitted that they persistently worked with the alternating current, introducing generators and motors which have met with marked success everywhere.

Alternating current is of great commercial value, as its pressure can be transformed in a very simple manner for long distance transmission, and it can be changed into direct current at any required voltage. Alternating current motors have also been introduced, one of the most popular and efficient of which is the Westinghouse type C induction motor. This motor, shown in Fig. 1, has been brought to a high degree of perfection, both in mechanical simplicity and electrical efficiency. The Westinghouse type C induction motor has two main elements—the primary, which is directly magnetized by the currents supplied from the circuits, and the secondary, in which low potential currents are induced by the action of the primary. The windings of the primary are so arranged that when supplied with alternating currents differing in phase, i. e., polyphase currents, a rotating magnetic field is produced. This field works upon the secondary windings and induces current therein. Rotation is produced by the action between the secondary and the rotating field of the primary.

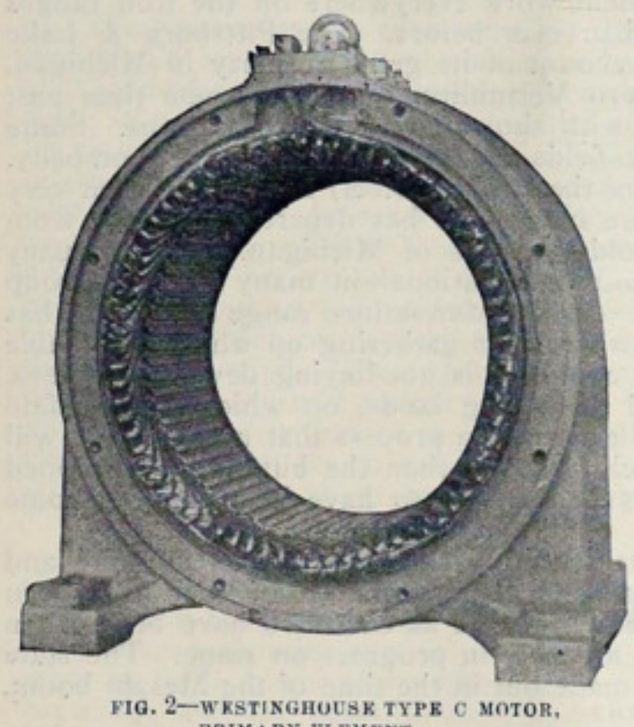


FIG. 2—WESTINGHOUSE TYPE C MOTOR, PRIMARY ELEMENT.

It will be noted that from a mechanical standpoint this motor is reduced to the simplest possible elements, namely, a stationary part permanently connected to the main circuits, and a rotating part having no electrical connection with any other and absolutely no electrical contacts or adjustments; in fact, no sliding or working friction except that of the shaft of the journals. The only parts that can wear, therefore, are the shaft and journal boxes. The friction in these is very slight, on account of the light weight of the rotating part. Ample self-oiling bearings provide for liberal lubrication.

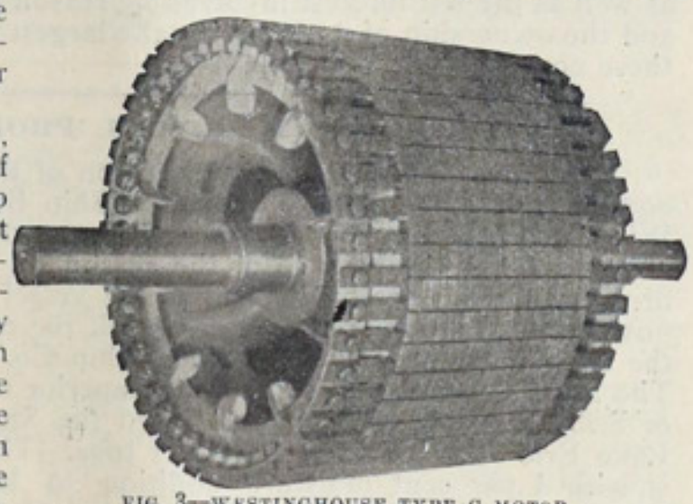


FIG. 3—WESTINGHOUSE TYPE C MOTOR, SECONDARY ELEMENT.

The primary element, shown in Fig. 2, consists of a hollow cylinder built up of laminated rings of sheet steel, mounted on the inside to receive the conductors. The rings are rigidly supported by the cast iron housing which encloses the primary and forms the frame of the motor. In motors of large sizes the rings are not continuous, but are made up of segments, which are dove-tailed and are fitted into corresponding slots in a hollow cylindrical shell of cast iron. This shell is held in the cast iron frame of the motor. The conductors are usually machine wound coils of wire, which are thoroughly insulated before being slipped into the slots of the primary iron core. In some of the larger motors a copper strap, bent into the proper form, is used instead of wire for forming the coils.

The secondary element, shown in Fig. 3, is built up of laminated steel discs of a high grade of metal, mounted upon an open spider and carrying in slots around the periphery the rectangular copper bars of the winding. The construction is such that the conductors can not be thrown out by centrifugal force, the whole secondary being extremely simple, rigid and durable. The same general form of construction is used for motors from 1 horse power to 500 horse power. The conductors of the secondary are all purposely short circuited, therefore it is evident that no accidental short circuit can possibly occur that will cause injury to the windings

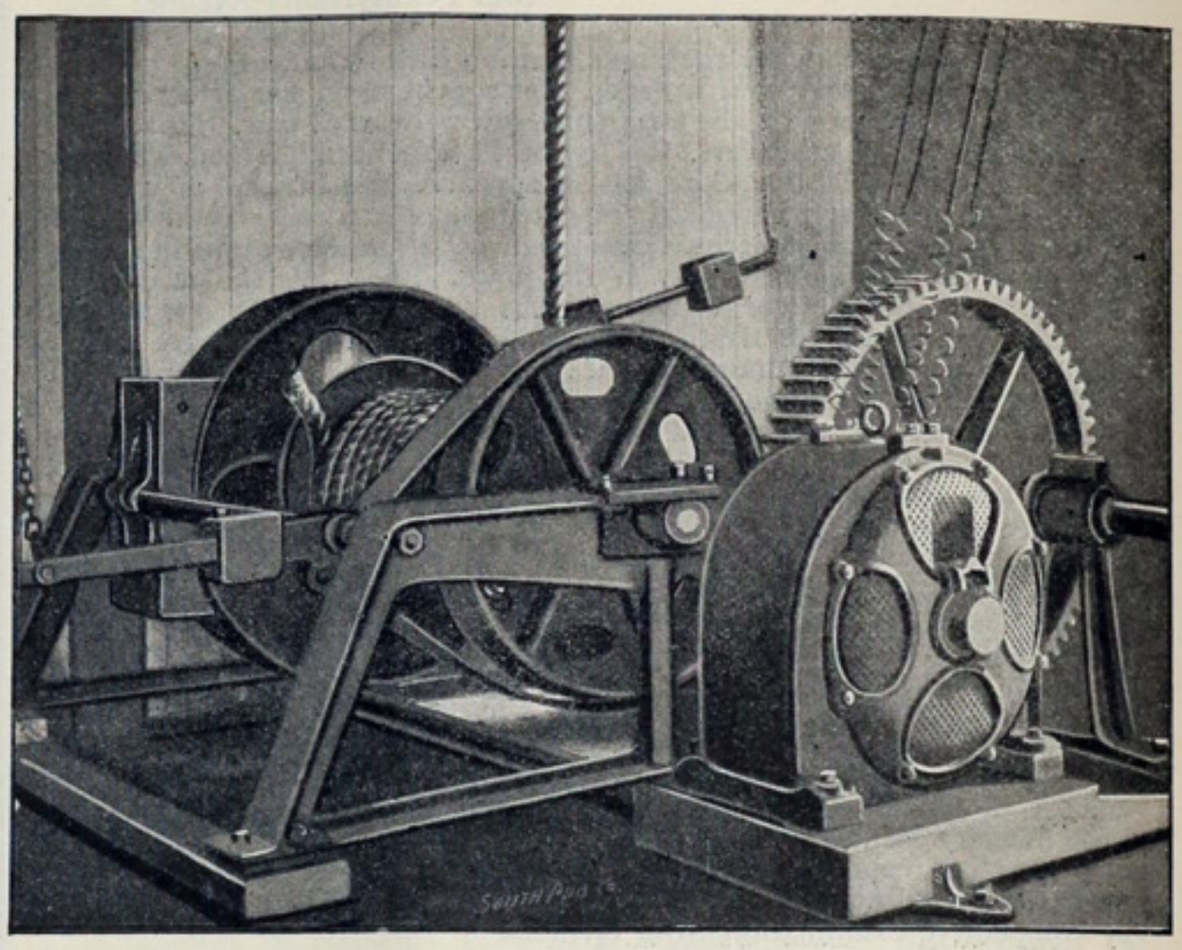


FIG. 4—WESTINGHOUSE TYPE C MOTOR OPERATING HOIST.

Type C motors may be suspended at any angle. The end brackets, which are a part of all motors up to 200 horse power in capacity, may be bolted to the frame in any one of eight different positions, so that the oil chambers in the brackets will be in the proper position whether the frame is bolted to the floor, the wall, the ceiling or at a 45-degree angle. This kind of motor is also made with a variable speed for cranes, elevators, hoists and similar classes of work. The variable-speed motor is almost identical in construction with the constant-speed type, but is especially designed to give a different speed curve and is supplied with suitable regulating devices when necessary.

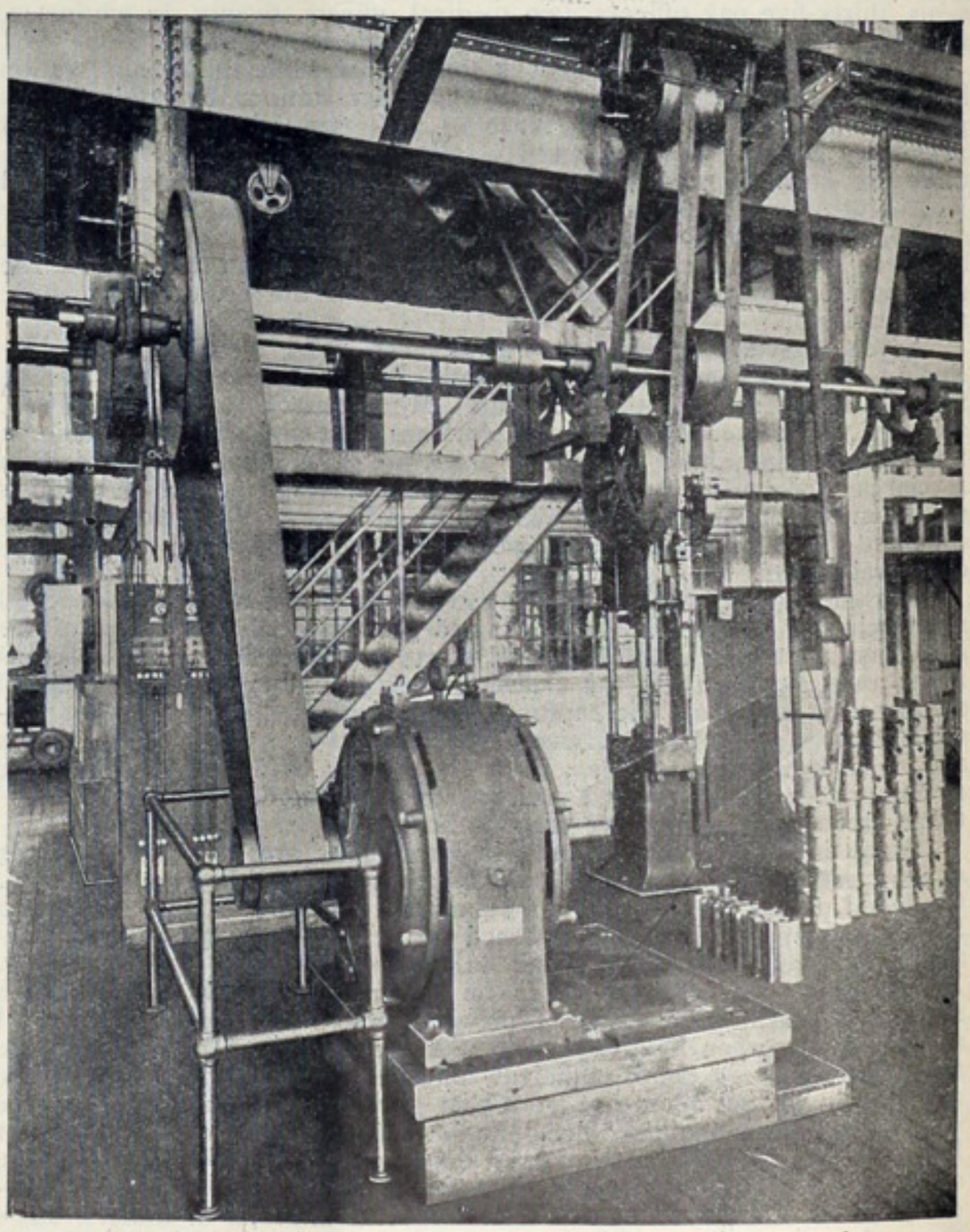


FIG. 5—WESTINGHOUSE TYPE C MOTOR DRIVING SHAFT.

The motor is capable of developing a torque several times its normal full load torque. It is therefore not liable to be stopped by a momentary overload. Moreover, in cases where the motor is overloaded for a short

time, or is even brought to rest under an extremely heavy load, it is not injured. There is no commutator at which sparking and flashing may cause burning and injury; there are no moving contacts of any kind to become burned or injured; in fact there is nothing to damage the motor except the heating of the conductors, and they will not reach any dangerous temperature until some little time has elapsed.

The starting device may be remote from the motor. When it is necessary to install motors in a grain elevator, a woolen mill, or in any place exposed to inflammable gases or floating particles, the starting devices may be located at a convenient point more or less remote from the motor, thus entirely eliminating all danger from fire due to possible sparks. This feature is also of value when the motors are suspended from the ceiling or installed in places not easily accessible.

A Westinghouse type C motor connected with the Long & Allstatter shears especially adapted to ship yard work was illustrated in a recent issue of the Review. These motors are built with three bearings and pulley for belt connection, or with two bearings for direct coupling with the machine to be operated. Fig. 4 shows a Westinghouse type C motor operating a hoist, and Fig. 5 is a view of a Westinghouse type C motor belted to shafting. For this latter purpose the motor can be placed on a raised platform projecting from the wall, and thus occupy no floor space.

Electric motors are also being introduced very largely and with marked economy into steel rolling mills. The heaviest rolls will probably be operated electrically when a little more experience has been gained. There is room for improvement on the present practice, as a direct coupled rolling engine is liable to stop on or near a dead center, consequently a very large engine has to be installed which works at low efficiency on account of the situation. An electric motor has no dead center, and the engine employed to generate the electricity may be of the most efficient type. Another advantage of employing electric power is that many operations may be effected by motors, each one drawing upon the central power house for the exact amount of energy used, and no more. They are adapted for such operations as moving live rollers, the elevating and traverse gear, overhead cranes, etc. Experts have testified that in mills and factories where electricity from a central power house has replaced separate steam engines, and the machines use power intermittently, only one-third to one-seventh of the power formerly required is now used.

VESSEL BUILDING IN ALASKA.

Boat building has been carried on very actively during the past spring at Lake Bennett and on the Yukon river, Alaska. The steamer Scotia, 80 feet long, 20 feet beam and 4 feet depth of hold was built by Capt. E. W. Spencer of Portland, Ore., on Atlin lake. On Lake Bennett during the spring months six river steamers and over one hundred scows and barges have been built, and two river steamers have been overhauled and repaired. One of the best vessels constructed was the steel steamer Australian, built at a cost of $75,000 by the Canadian Development Co. She is 115 feet long, 24 feet beam and 3 feet draught. She has accommodations for 175 passengers and will carry 100 tons of freight. The Bennett & Atlin Lake Transportation Co. built the $60,000 lake and river steamer Bailey, which is 110 feet keel, 126 feet over all, 22 feet beam and 4½ feet depth of hold. The steamer Ruth, built by the Northern Lakes & Rivers Navigation Co., of Victoria, B. C., is 60 feet long and 16 feet beam. Capt. J. Irving, also of Victoria, has built the Gleaner, a vessel 115 feet long, 24 feet beam and 5 feet depth of hold.

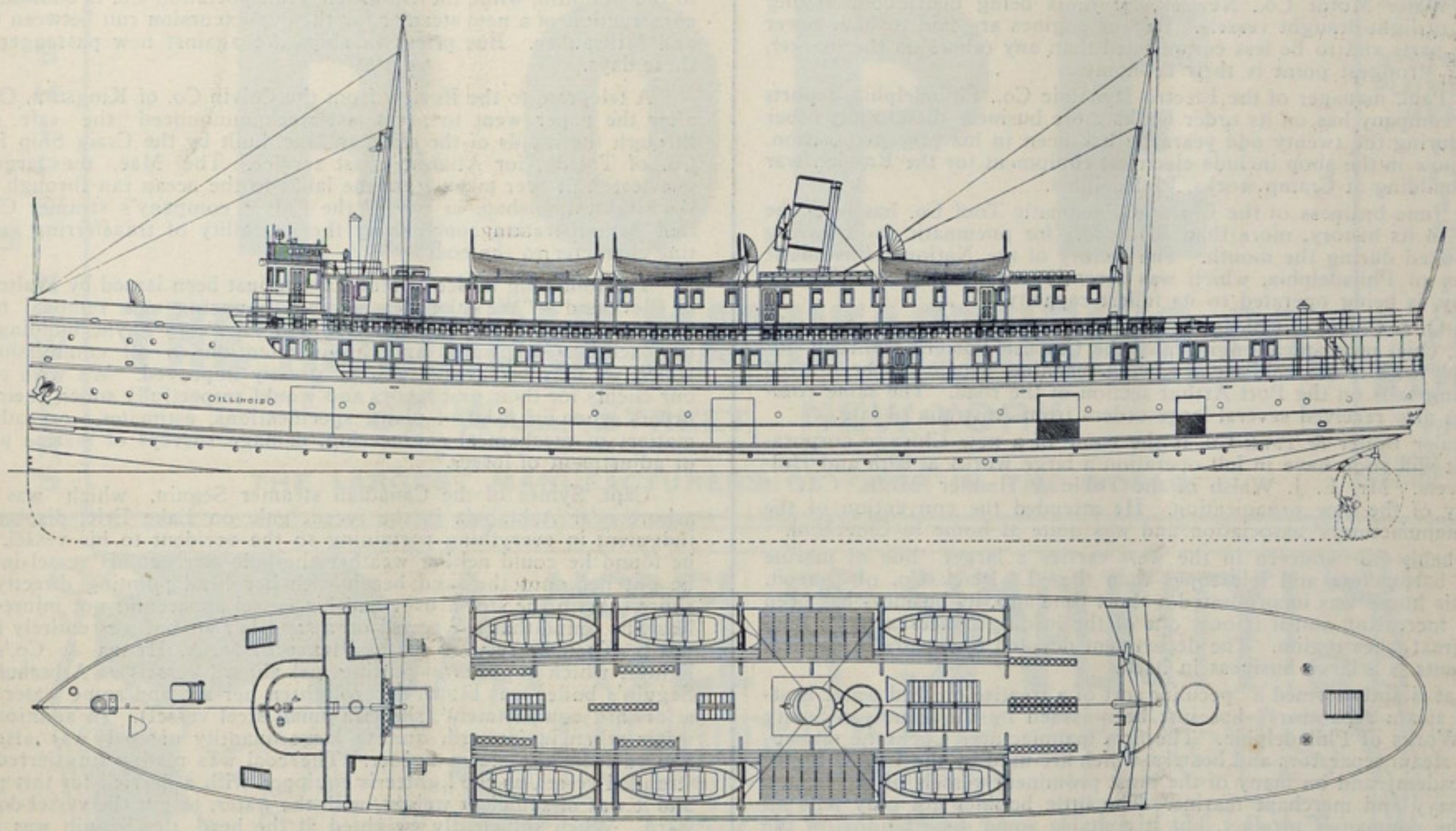
The Bullock Electric Manufacturing Co. of Cincinnati reports the sale of a ten-horse-power crane motor to the Maryland Steel Co.

STEAMER ILLINOIS.

A HANDSOME STEEL PASSENGER AND FREIGHT VESSEL, RECENTLY COMPLETED AT THE WORKS OF THE CHICAGO SHIP BUILDING CO.

Were it desired to select a vessel thoroughly representative of the best type of screw steamer for short runs in freight and passenger service on the great lakes, no fitter choice could be made than the Illinois, recently completed at the works of the Chicago Ship Building Co., South Chicago, Ill., for the Northern Michigan Transportation Co. of Chicago. To the supervision of the construction of this vessel, General Manager W. I. Babcock gave personal attention, and the Illinois is therefore a craft which evidences in every way the especial degree of attention bestowed upon her.

The Illinois is a steel passenger and freight steamer of the following dimensions: Length on keel, 225 feet; beam, moulded, 40 feet; depth, moulded, 16 feet. She has a triple expansion engine with cylinders of 20, 33 and 54 inches diameter and 36 inches stroke, and two Scotch boilers 12½ feet diameter by 11½ feet long, arranged for forced draft on the closed ash pit system and allowed a working pressure of 175 pounds. Her indicated horse power is 1,500 and her speed 17 miles an hour. She has bunker capacity for 120 tons of coal, and can carry 700 tons of cargo on 12 feet draught. There are seventy-seven state rooms and total berthing accommodation for 224 first-class passengers. All staterooms are fitted with open, nickel plumbing and are provided with running water, both hot and cold. The crew, numbering seventy, with the exception of officers, are carried on orlop decks forward and aft. On the forward orlop deck is also located the galley and officers' mess room. The pantry is just forward of main saloon, the forward part of which is used as a dining room. The main deck, with the exception of the social hall aft and crew's mess rooms forward, is entirely given up to freight and baggage.



OUTBOARD AND DECK PLANS OF THE STEAMER ILLINOIS BUILT BY THE CHICAGO SHIP BUILDING CO. FOR THE NORTHERN MICHIGAN TRANSPORTATION CO.

The main saloon is on the spar deck and is lighted by a dome running all fore-and-aft, on top of which is the upper saloon. The main saloon and social hall are finished in curly birch, the upper saloon in white enamel and gilt. The smoking room, located just forward of the upper saloon, is finished in golden oak and is fitted with leather-covered settees. Above the hurricane deck a bridge deck extends for about two-thirds the vessel's length at the height of the top of the upper saloon. On this deck are carried six metallic life boats and two rafts.

The vessel is lit throughout by electricity, furnished by two direct connected generators of 10 and 15 K. W. capacity, respectively. A searchlight is carried on top of the pilot house. There is a steam hydraulic elevator from the main deck to forward hold for handling freight and dumb waiters from the main deck to galley and from pantry to galley. The vessel is provided with two stockless anchors, a steam capstan windlass forward and steam dock capstan aft. She is also fitted with hand and steam steering gear.

Another serious accident during a trial of a torpedo boat is reported from Cowes, England. As the result of an explosion on the new 30-knot torpedo boat destroyer Bullfinch, eight men were killed and eleven injured, among the latter being the engineer in charge. The vessel was running at her full speed of 30 knots when the connecting rod of the starboard engine broke, knocking off the end of the piston and causing an immediate rush of steam from the cylinder. The cabled report asserts that a hole was blown in the vessel's bottom.

TRADE NOTES.

Large sales of the Simpson centrifugal separator are being made in all parts of the country by the manufacturers, the Keystone Engine & Machine Works, Philadelphia .

One hundred Globe gas engines of marine type in sizes ranging up to 50 horse power have been sold thus far this season by the Pennsylvania Iron Works Co. of Philadelphia.

The John Baizley Iron Works of Philadelphia, besides having orders for a large amount of marine work, has lately secured an order for a complete equipment of engines and machinery for the Borden Condensed Milk Co. of New York.

Mr. W. P. Bement of Bement, Miles & Co., Philadelphia, says that every department of the company's works is being operated to its fullest capacity. The consolidation of Bement, Miles & Co., the Pond Machine Co. and the Niles Tool Works has not as yet been consummated.

J. W. Cregar, who has been for some time engaged in a general machinery business in Philadelphia, with offices and store rooms in the Bourse (exhibition department), has recently taken charge of the Pratt & Whitney Co.'s New York office, corner of Liberty and Greenwich streets.

The Ashton Valve Co. of Boston, was fully in evidence at the meeting of the boiler manufacturers in Cleveland, or rather Mr. Columbus Dill was there and managed to become acquainted with everybody at the convention before he left. He had a neat souvenir, a match case, to distribute among the delegates.

A neat catalogue of gas and gasoline engines, manufactured by the Backus Water Motor Co., Newark, N. J., is being distributed among builders of light-draught vessels. Backus engines are said to have fewer working parts and to be less complicated than any others on the market, but their strongest point is their economy .

Mr. Paul, manager of the Electro-Dynamic Co., Philadelphia, reports that his company has on its order books more business than in any other season during the twenty odd years he has been in his present position. Orders now in the shop include electrical equipment for the Russian war vessels building at Cramp works, Philadelphia.

The June business of the Chicago Pneumatic Tool Co. has been the heaviest in its history, more than 500 orders for pneumatic tools having been booked during the month. The factory of the National Pneumatic Tool Co. of Philadelphia, which was recently acquired by the Chicago Company, is being operated to its fullest capacity.

The Q. & C. Co. of Chicago has secured a contract from V. A. Kashivenkoff, chief mechanical engineer of the Chinese Eastern Railroad, for the supply of a steam cold metal sawing machine, which will be utilized for cutting rails on the Port Arthur section of the road. The same company has also received several large orders from Australia of late.

Hamler Boiler & Tank Co. is the name of a new Chicago corporation that will soon have in full operation a large works at 39th and Halsted streets. Mr. E. J. Walsh of the Tobin & Hamler Mnfg. Co., is secretary of the new organization. He attended the convention of the boiler manufacturers' association and was quite at home in Cleveland.

Probably no concern in the west carries a larger line of marine glasses, barometers and telescopes than the L. Black Co. of Detroit. Since this house was incorporated a short time ago, its business has been steadily increasing and it is now one of the leading concerns of its kind in the great lakes region. The department devoted to repairs of nautical instruments is a large business in itself.

What is aptly termed a "peculiar sort of a treatise on feed water heaters and steam separators" has just been issued by the Harrison Safety Boiler Works of Philadelphia. The firm manufactures Cochrane oil separators, steam separators and heaters, which are used by the United States naval academy and on many of the most prominent vessels of the United States navy and merchant marine. The little booklet not only tells all about the company's product, but it contains some dissertations on the subject of the economical administration of a steam plant that ought to interest every owner of one.

A small folder, just issued by the Chase Machine Co., engineers and machinists of Cleveland, deals with their specialties, including a deck hoist, of which there are more than 100 in use. This hoist is furnished with deck bilge pumps and complete boiler outfits, messenger chain attachment to windlass, friction bands on drum or in any desired arrangement. This company sold during the past spring about thirty machines of the kind that are now used on the big freighters of the great lakes for docking and hauling purposes, replacing steam capstans. Engines of these machines are 7 inches diameter and 8 inches stroke and reverse with a patent valve motion. The drums are 12 inches diameter and 18 inches long, fitted with independent brakes. There is also illustrated and described in the pamphlet an auxiliary stern windlass or double-geared deck engine, used on the large steel ore and coarse freight carriers to handle the after anchors, and also amidship on these same vessels for deck engines. This machine is furnished with two drums, if desired, or with wild cat for chain, in place of wire rope drum, or with auxiliary hand power; with deck pumps, or in other sizes, in any desired arrangement.

AROUND THE GREAT LAKES.

Mr. E. W. Oglebay of Oglebay, Norton & Co., Cleveland. sails this week for Europe.

Capt. George W. Moore of the United States revenue cutter service on special duty at Chicago as inspector of the United States lifesaving service for the eleventh district, died of apoplexy at the marine hospital, Chicago, on the 25th inst.

The Richelieu & Ontario Navigation Co. of Montreal, has purchased from the Baltimore Packet Co. of Baltimore, Md., for $80,000, the steamer Virginia. The boat, which has a capacity of 350 passengers, will replace the Carolina on the Saquenay route.

Drake & Maytham of Buffalo, who libeled six grain cargoes last fall on demurrage claims, have received the amount of their claims on the Germanic and Philip Minch from the shippers, Hancock & Co. of Philadelphia, without beginning suit. They expect settlement on the others also.

It is reported from Superior, Wis., that officials of the Great Northern Ry. Co., or rather the Eastern railway of Minnesota, which is controlled by J. J. Hill of the Great Northern, are already making preparations for the construction next winter of a second ore shipping dock on Allouez bay, near Superior. The Great Northern and American Steel & Wire interests are very closely related.

Unconfirmed newspaper reports are to the effect that contracts may be let some time this autumn for two additional passenger vessels for Lake Michigan service. According to the rumor, the Lake Michigan & Lake Superior Transportation Co. has practically decided to build a sister ship to the Manitou, while the Goodrich Transportation Co. is considering the construction of a new steamer for the day excursion run between Chicago and Milwaukee. But prices of ships are against new passenger vessels these days.

A telegram to the Review from the Calvin Co. of Kingston, Ont., just after the paper went to press last week announced the safe passage through the rapids of the steamer Mae, built by the Craig Ship Building Co. of Toledo, for Atlantic coast service. The Mae, the largest and heaviest craft ever taken from the lakes to the ocean ran through without the slightest mishap, in tow of the Calvin company's steamer Chieftain, thus demonstrating conclusively the feasibility of transferring vessels of this character to the coast.

The following notice of removal has just been issued by Walter Miller of Cleveland: "We take pleasure in announcing our removal to more commodious quarters in rooms 406 and 407 Perry-Payne building, where our facilities for prompt and careful attention to all commissions with which we may be favored will be greatly improved. We wish to thank our clients for their past favors and would respectfully solicit their further orders when in need of plans, specifications, estimates, or advice in matters of mechanical engineering, damage surveys of marine property, or adjustment of losses."

Capt. Symes of the Canadian steamer Seguin, which was driven ashore near Ashtabula in the recent gale on Lake Erie, displayed rare judgment in everything pertaining to the accident to his vessel. When he found he could neither weather the gale nor get his vessel into port, he put her onto the sand beach with her head pointing directly to the shore. With the storm over and his vessel apparently not injured in the least, he found that she rested on a sand bar aft but was entirely free forward. Then he secured the assistance of M. A. Hanna & Co.'s steam lighter, which engages in putting fuel aboard vessels at Ashtabula. The Seguin's boiler was blown off to lighten her aft, and some water let into a forward compartment (she is a small steel vessel). In addition to the water taken in forward, quite a large quantity of coal was also taken aboard from the steam lighter. The coal was readily transferred to the stranded vessel, as the lighter is equipped with a derrick for this purpose, and it was of sufficient weight, with the water, to put the vessel down forward. When sufficiently weighted at the head, the Seguin was released aft, and she was afloat a few hours after the job was begun.

"PYRO" IS ALL RIGHT.

The Shearer-Peters Paint Co., recently succeeded by C. Wilford Peters, who has done extensive advertising during the past three months, is enthusiastic over results obtained through correct advertising methods. Within the past two weeks orders for "Pyro" paint have involved shipments to Canada, England, Scotland, Porto Rico and South America. A third order was filled recently for the Pittsburg, Bessemer & Lake Erie Railroad Co. at Pittsburg, and orders are coming in daily from different points throughout the entire country. This would indicate that "Pyro" paint is all right. Attention is directed to the company's advertisement in this issue.

PROGRESS WITH THE STOCKTON.

Editor Marine Review:—In your issue of July 20 you have a table showing the progress of vessels now building for the United States navy. In this statement you give the Stockton zero. The statement of the naval constructor at our works gives the degree of completion of the Stockton on the first of July at 30 per cent., and we would thank you to correct this in your next issue.

Richmond, Va., July 25. WILLIAM R. TRIGG COMPANY.

One of the Grand Trunk car ferries, the Huron, which was operated on the St. Clair river in the vicinity of Port Huron previous to the construction of a tunnel at that point, is to be rebuilt at the works of the Detroit Ship Building Co.

LLOYD'S SHIP BUILDING RETURNS.

Returns compiled by Lloyd's register of shipping for the quarter ending July 1 show that, excluding warships, there are under construction in the united kingdom 568 vessels of 1,386,367 gross tons, as compared with 580 vessels of 1,322,068 tons in 1898. Of this number 541 are steam and twenty-seven sail vessels. This, as will be seen, shows a falling off of less than 1 per cent from the unprecedentedly high figures at the close of 1898. Of the 568 vessels building, 444 are owned by Great Britain. Of the remainder the United States has two vessels. In the matter of war vessels there are building in yards of the united kingdom fifty-eight vessels of 350,200 tons for the British government and twenty-seven vessels of 101,875 tons for foreign governments, a total of eighty-five vessels of 452,075 tons. In the Lloyd's report of foreign ship building there is a showing of six steam vessels of 22,350 tons building at Newport News, Va.; twenty-two steam vessels of 37,100 tons building at Philadelphia and Chester; two steam and eight sailing vessels of an aggregate tonnage of 5,256 building on the Pacific coast.

A quarantine vessel to be used by the United States government in the harbor of Havana has been launched from the ship yard of the Kensington Engine Works at Philadelphia, after one unsuccessful attempt. The vessel is 160 feet in length, 32 feet beam and 12½ feet depth of hold. Her displacement is 600 tons and she cost $75,000. At Havana she will replace the floating quarantine Protector, which will be sent to the harbor of Santiago.

U. S. Engineer Office, 57 Park Street, Grand Rapids, Mich., July 21, 1899. Sealed proposals for repairing government piers at Pentwater, Mich., will be received here until 3 p. m., August 5, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs.
Aug. 3.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., July 14, 1899. Sealed proposals for Hydraulic Dredge will be received here until 3 p. m. August 28, 1899, and then publicly opened. Information furnished on application. Chester Harding, Captain, Engrs.
Aug. 10.